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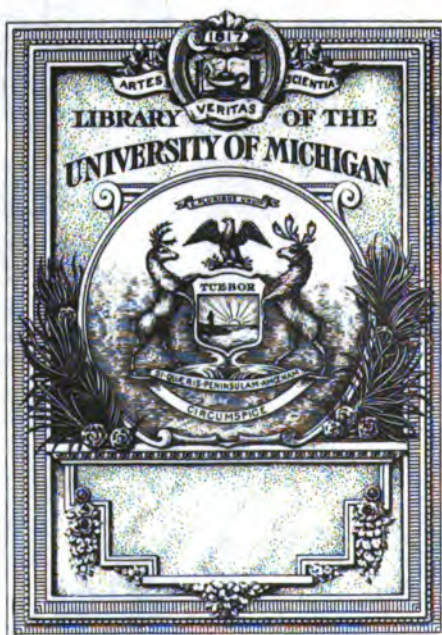
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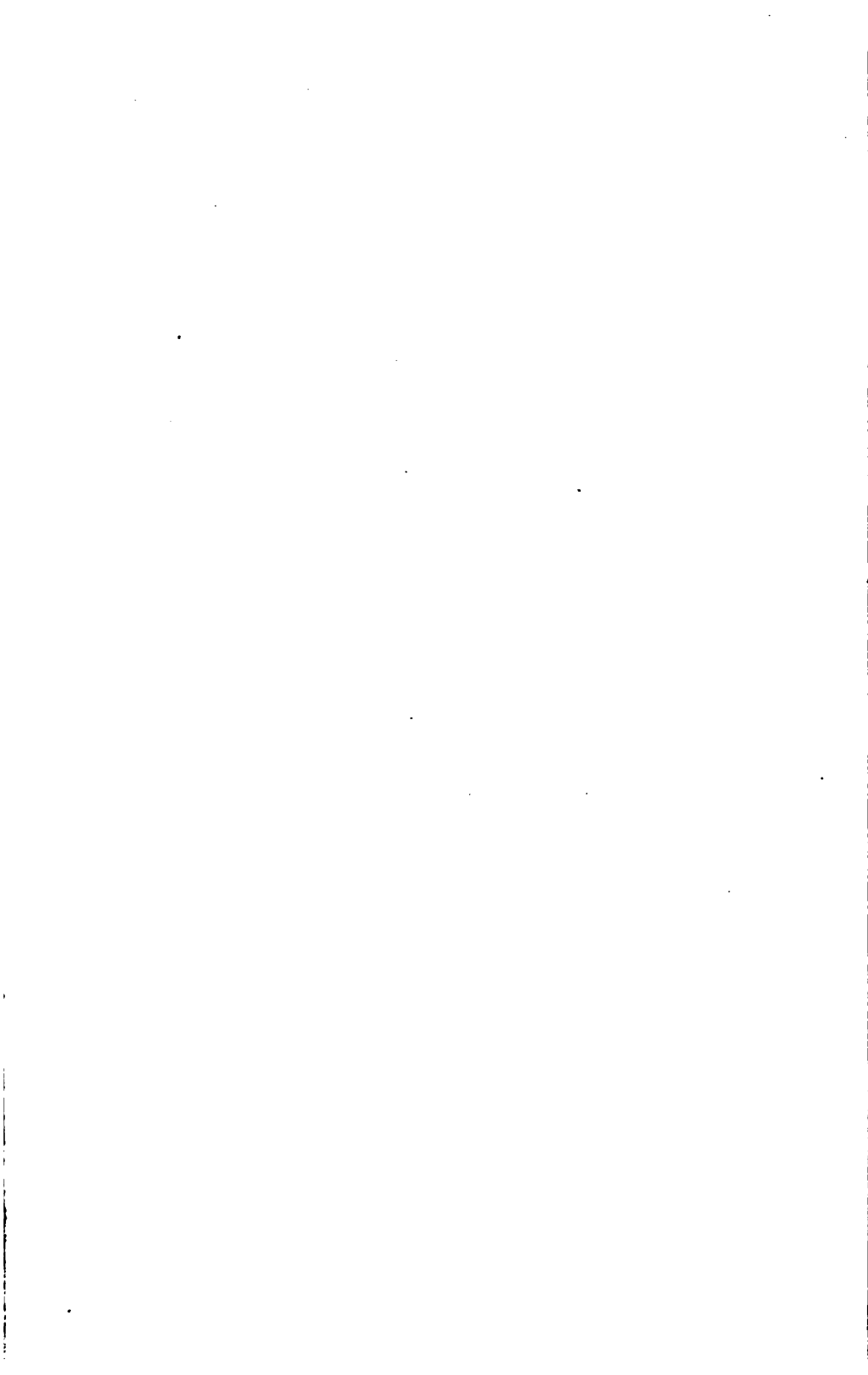
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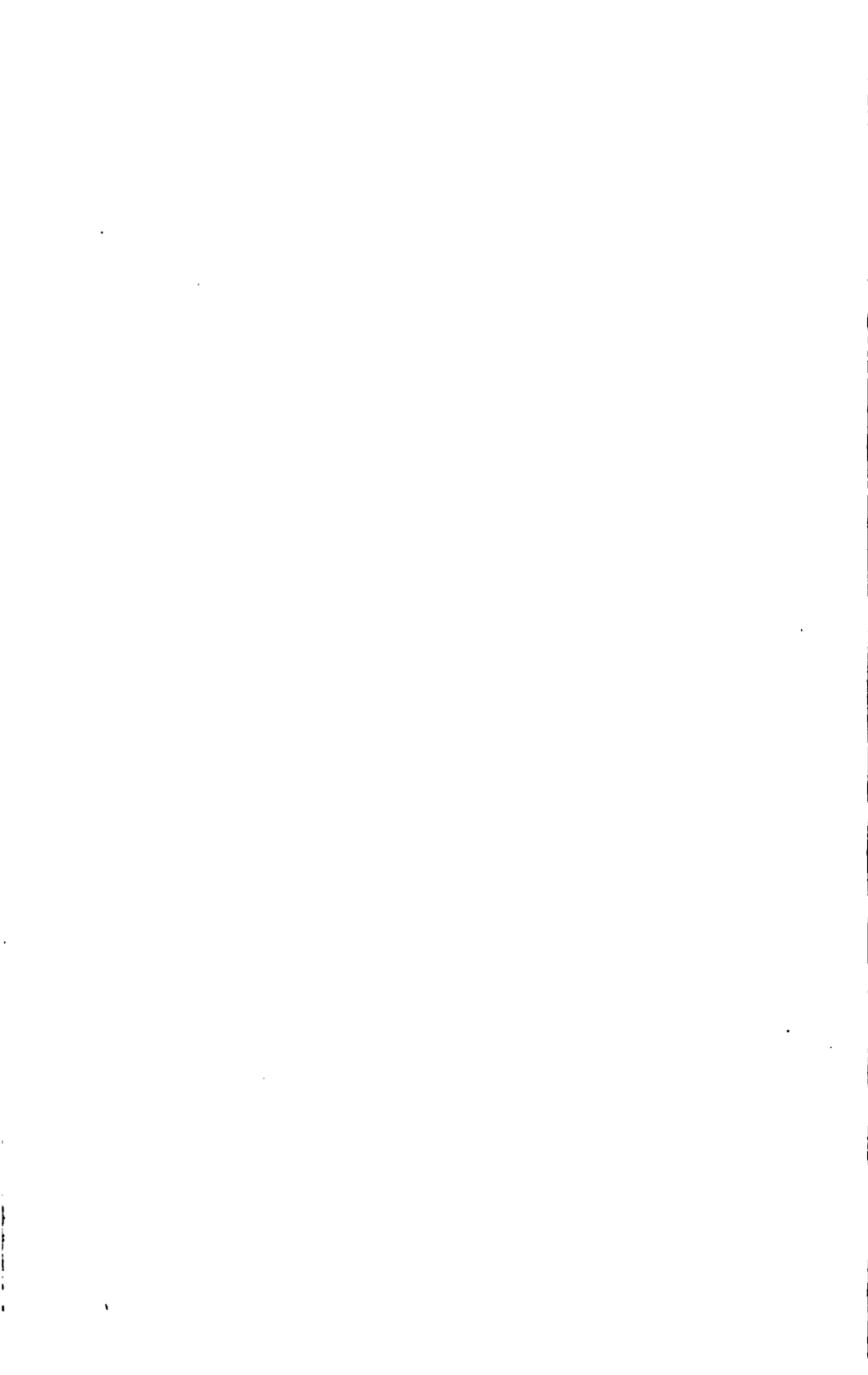


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The Canadian Entomologist

VOLUME XXXIII.

No. 1.

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REV. C. J. S. BETHUNE,

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1901.

EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

LEPIDOPTERA (in papers) of any foreign country wanted in exchange for same of this vicinity. Send an assortment and receive same quantity. JOHN COMSTOCK, 1572 Ridge Ave., Evanston, Ill., U. S. A.

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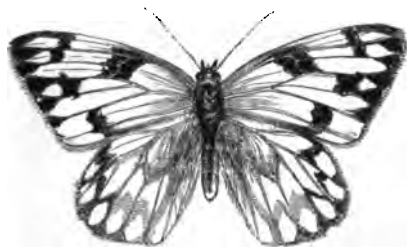
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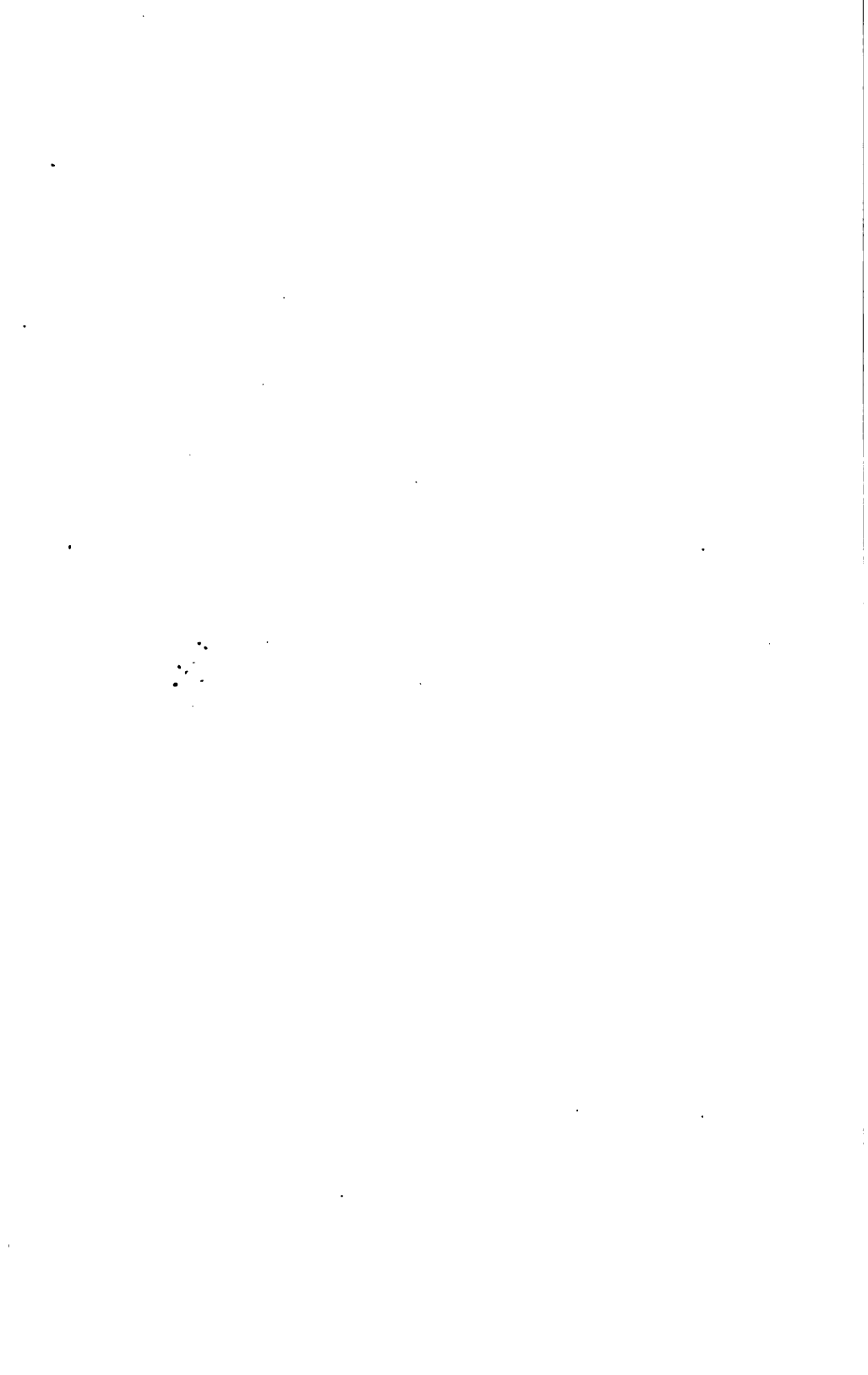
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No. 1

LIFE-HISTORY OF XYLINA BETHUNEI, G. & R.

BY HENRY H. LYMAN, MONTREAL.

On the evening of 17th of April, 1898, a ♀ of this species entered my room, and was bottled and not looked at again until the morning of the 19th, when it was found that the cyanide in the bottle was exhausted and that the moth was still alive and had laid a considerable number of eggs. The eggs were distributed through the cotton wool at the bottom of the bottle, and this had to be carefully pulled to pieces thread by thread to secure the eggs.

The following description was taken :

Egg.—Somewhat of gumdrop shape, .60 mm. in diameter, wider than high. Many low ribs rising from the base, the whole surface pitted with rather large depressions having the appearance near the apex of short transverse striæ. Colour when laid, creamy with a tinge of green, soon turning whitish and then soon showing a mottling of brownish red. Later they turned darker, but the mottling remained ; hatching 1st and 2nd May. Egg period about 14 days.

Young larva.—Stage I : Length, at rest, 1.42 mm.; in motion, 1.70 mm. Head large, considerably exceeding the 2nd segment, lower part projecting forward. Colour creamy white, but with a darker interior shade beginning at the 3rd segment and extending about two-thirds to anal end, but darker and more marked on the anterior segments. Setæ long, concolorous, as are also the feet and claspers.

The larvæ were offered wild cherry, red-oak bud, hawthorn, silver maple, white birch, willow, plantain, ash, apple. They ate several of the foods offered, but preferred cherry, maple or apple ; hawthorn, birch and plantain were not touched.

By the 5th May the general colour was a pale green, the interior shade being dark green, though some did not show the darker interior shade, being uniformly pale green.

Passing 1st moult 7th May ; described 9th May.

After 1st moult.—Stage II: Length 6 mm. Head pale greenish with a few white hairs, ocelli black. Body pale green, dark green interiorly, with a whitish subdorsal line, and a similar subspiracular line. Warts whitish.

By the 12th some had passed 2nd moult.

After 2nd moult.—Stage III: Length 8.60–9.40 mm. Head pale horn colour. Body green, darker, especially interiorly, above, yellowish green below. There is now a very broken dorsal line of short white dashes. The warts are conspicuous, being of a shiny white, like glazed china. Setæ short and whitish; spiracles very inconspicuous. These larvæ are sometimes restless, but do not tend to stray from the food-plant. They constantly spin threads, so that when picked up with a camel's-hair pencil they are sometimes pulled back by the thread.

While under observation one began to clear away the frass from the maple leaf it was on, picking the pieces up with its jaws and throwing them aside. One mass so thrown consisted of six or more pellets stuck together.

By the 15th nearly all had passed the 3rd moult.

After 3rd moult.—Stage IV: Length, at rest, 12 mm.; in motion, 14.5 mm. Very evenly cylindrical, but with a slight fullness about the 12th segment. Head very pale green with a few whitish hairs, mouth-parts whitish, ocelli rather inconspicuous. Body green with yellowish shades, especially at the segmental folds. Warts as before.

The white lines are the same as before, but the subspiracular fold is strongly marked and is yellowish white. There is an indication by white dots of another line between the subspiracular fold and subdorsal stripe. The spiracles are small and very inconspicuous. Feet and claspers pale greenish.

Passing 4th moult 17th May.

After 4th moult.—Stage V: Length, at rest, 15.6 mm. Head, 2nd and 13th segments, light green, rest of body yellowish green. Warts and stripes as before, white. Setæ pale yellowish, subspiracular fold yellowish white, feet and claspers light green.

On 22nd nine out of fourteen in one jar were found to have passed the 5th moult, and the appearance of the larva is now entirely changed.

After 5th moult.—Stage VI: Length, at rest, 24 mm.; in motion, 28 mm.

Head pale greenish horn colour mottled with blackish green. Body

greenish gray, mottled on part above the subspiracular fold with velvety black. Top of the second segment almost solidly black, with a thin pale horn colour dorsal line, the warts very small and similar in colour to dorsal line. This black patch is bordered on the sides by a whitish line, and below is a clear greenish wedge-shape space, wider anteriorly; below this it is mottled in black to the subspiracular band. Dorsal stripe from 3rd segment to 13th yellow, shaded with orange. Warts distinct, white like glazed porcelain. Setæ rather weak, pale in colour. On 8th to 11th segments there are two small white dots like warts in advance of wart i., at about same distance from i. as ii. is. These spots are a little further from the dorsal line than i., but not quite as far as ii. Subdorsal stripe broken up into a line of spots, subspiracular fold broad, cream colour; just above this a black band of varying width, widest at the spiracles, which show upon it as white ovals; between this and the subdorsal stripe there is a series of white dots.

The black mottling tends to be grouped about the warts and other white dots.

The top of the 12th segment is slightly swollen. Below the subspiracular fold the body is pale green with only a powdering of black atoms about the warts v. and vi.

Feet and claspers pale green.

On 23rd May I noticed that there were only 13 larvæ in the jar where there had been 14, and it is possible that one had been eaten, though they had never been short of food. In the other jar cannibalism, which is a characteristic of this group, had evidently been practised, as evidenced by the remaining anal extremity of a larva which had apparently been devoured when in process of moulting.

I therefore separated them into four jars so that they should have more room. One larva was of a much grayer tone than the average, being wanting in the greenish shade. The larvæ were mature about the end of May, the colour as usual changing just before the pupation, the greenish shade of the upper area giving place to a pinkish tinge.

The length of the mature larva is 31-32 mm. The larva enters the ground and makes a close cocoon of grayish silk and pellets of earth. The pupa is of the usual noctuid type. The moths began to appear about the 29th July, and continued to emerge for a week or ten days. This is very much earlier than they would have emerged had they been subjected to the vicissitudes of their natural life out of doors.

NEW JASSIDÆ FROM THE ROCKY MOUNTAIN AND
PACIFIC REGION.

BY E. D. BALL, FORT COLLINS, COLO.

The following species, with a few exceptions, were taken by Mr. E. P. Van Duzee and the author while on a very interesting and successful trip through southern and western Colorado during the latter part of July, 1900. These species are all strictly south-western in distribution as far as known, and most of them were found feeding on one or another of the peculiar plants of that region. While collecting in the valley of the Grand River, a number of species of Homoptera were taken, hitherto only known from the Californian region, and it is very probable that in turn several of these species, which were taken along with them, will, eventually, be found in California.

HECALUS BRACTEATUS, n. sp.

Resembling *brunneus*, the elytra shorter in the female, longer in the male. Head longer and thinner. Female, pale yellow. Male, milk-white with fuscous lines. Length, ♀ 7 mm., ♂ 5 mm. Width, ♀ 1.5 mm., ♂ 1.25 mm.

Female.—Vertex long, with a foliaceous margin, disc transversely convex, the lateral margins but slightly narrowed for half the length, then forming a parabolic curve. Length and width in front of eyes about equal, two and one-fourth times the length of the pronotum. Elytra brachypterous, covering the first abdominal segment, as long as the vertex, their apices rounding. Venation reduced, a broad margin outside of the first section, which is once forked, no apical and rarely more than one ante-apical cell present.

Male.—Vertex roundly triangular, its basal width one-third greater than its length, slightly longer than pronotum, margin not foliaceous. Elytra long and narrow, much longer than abdomen, venation distinct, somewhat irregular, usually the second cross nervure present, forming three anteapical cells, of which the second is much the longer.

Colour: female pale yellow or straw colour, the elytra with a few fuscous dots next the nervures; abdomen with a pair of olive stripes on each side, these stripes margined with dotted fuscous lines, a similar median line. Sometimes the olive stripes disappear, leaving the abdomen with nine dotted fuscous lines. Male milky white, sometimes with five olive stripes, dotted with fuscous, on vertex and pronotum. Elytra

with the milk-white nervures margined with fuscous dots. Upper half of the face fuscous.

Genitalia : ultimate ventral segment of the female as long as the penultimate, the posterior margin roundly emarginate, with a broad blunt tooth. Male, valve triangular, plates triangular, the margins slightly concave, fringed with stout spines ; plates about three times the length of the valve.

Described from numerous specimens from Rocky Ford, Colo. This species is apparently intermediate in structure between this genus and *Parabolocratus*. The females are all brachypterous and have the elongate head of a *Hecalus*, while the males are long-winged and have the short vertex of *Parabolocratus*.

ATHYSANUS SYMPHORICARPÆ, n. sp.

Form and size of *instabilis*, lighter coloured, resembling *striatulus*, but larger and lighter testaceous. Length, 4.5 mm.; width, 1 mm.

Vertex twice wider than long, half longer at apex than against eye, rounding to the broad almost parallel margined front, clypeus much narrower than apex of front, parallel margined. Elytra stout, longer than body as in *instabilis*, the central anteapical cell long, narrowed in the middle, more than half its length beyond the apex of clavus.

Colour : vertex and face yellowish testaceous, lines on front and irrorations on vertex fusco-testaceous. Pronotum and scutellum paler, with a slightly olive tinge. Elytra pale brownish or olive testaceous, subhyaline, the nervures light. Legs and all below pale orange testaceous.

Genitalia : ultimate ventral segment of the female little longer than the penultimate, the lateral margins narrowing, the lateral angles a little produced, triangular, between these the posterior margin is slightly rounding, shining black. One specimen has an acutely angular notch either side the middle, one-third the distance to the margin, leaving a broad central tooth ; one has only one notch ; and two, probably not having copulated, have none.

Described from four females from Ridgeway, Colo.

ATHYSANUS VARUS, n. sp.

Form and colour of *alpinus* and *extrusus*, but with a narrower body and longer elytra. Male darker, resembling *plutonius* female. Length, ♀ 5 mm., ♂ 4.25 mm. Width, ♀ 1.5 mm., ♂ a little over 1 mm.

Vertex roundly triangular, twice wider than long, two-thirds the length of the pronotum, disc convex, rounding to front, apex bluntly conical; front broad and flat, width between antennæ a little less than three-fourth its length. Elytra long, the outer margins almost parallel, their apices very broadly rounding. Venation strong, often accessory cross nervures along clavus and between sectors of corium; central anteapical cell very long, the posterior end angularly enlarged.

Colour: ground colour a dirty straw-yellow; vertex with a transverse band just back of the ocelli, the ends of which do not reach the eye, but curve forward to the front; another interrupted band half way between this and the posterior margin and two dashes curving away from the apex and paralleling the other bands, black. Elytra with the nervures white, the cells mostly filled with dark fuscous, omitting a transverse, hyaline, band across the juncture of apical and anteapical cells, a large milk-white patch on the cross nervures between the sectors, a smaller one at the apex of each claval nervure and sometimes another next to the claval suture. Face, dirty yellow arcs on front, especially on upper half; sutures, spots around the antennal sockets and the disc of the clypeus, fuscous. Male much darker than female, lower part of face and below black.

Genitalia: ultimate ventral segment of the female one-half longer than penultimate, posterior margin nearly truncate, the median third roundly produced; usually the segment is curved over the ovipositor so that it appears emarginate, with a quite pronounced median lobe; male valve less than half as long as its breadth at base, the apex rounding; plates no wider than the valve, slightly concavely triangular, the apex acute, two and one-half times the length of the valve, clothed with stout white spines.

Described from ten females and one male from Fort Collins, Colo.

Readily distinguished from any other American species by the genitalia and venation. There is a group of about six European species that possess the same milk-white elytral markings, of which *distinguendus* and *Schenkii* are similar in form, but none of them in venation and genital characters.

THAMNOTETTIX GRAECULA, n. sp.

Form of *flavocapitata* nearly, but stouter; as large as *Coquilletti*, which it somewhat resembles in colour. Length, ♀ 5.5 mm., ♂ 5 mm.

Vertex roundingly angular, the apex conical, scarcely two-thirds as long as its breadth at base, half longer than against eye; disc convex, rounding to the front except at apex; front broad, rather flat; clypeus broadest just before the rounding apex. Pronotum a little over half longer than vertex; elytra rather stout. Venation peculiar, resembling *longula*, except that the outer anteapical cell is pointed and petiolate anteriorly and the outer fork of first sector is very faint. Male smaller and with a blunter vertex.

Colour: pale yellowish olive; the female has two large spots within the basal angle and two smaller ones on the disc of the scutellum and the cross nervures between the sectors brown. Elytra with slight reddish cast. The males have no marking on scutellum, the elytra are distinctly embrowned, especially along the claval and apical areas. In both sexes there are a number of oval subhyaline areas. In the males there are three approximate pairs along the sutural margin.

Genitalia: ultimate ventral segment of female half longer than penultimate, the lateral angle rounding, the posterior margin triangularly emarginate from the lateral angles half way to the base; from the bottom arises a strap-shaped tooth equalling the lateral angles; male valve broadly evenly rounding. The plates, concavely, triangularly acuminate, about twice the length of the valve.

Described from one female and three males from Rifle, Durango and Colorado Springs, Colo.

SCAPHOIDEUS BLANDUS, n. sp.

Form and general appearance of *jucundus*, smaller and paler, lacking the reddish tinge of that species. Costal margin of elytra with numerous regular cells. Length, 5 mm.; width, 1.10 mm.

Vertex right-angled back to the eyes, which round off, not quite as long as its basal width, disc flat, margins straight, vertex and face forming an acute angle; front, margins straight, clypeus very slightly broadened below. Pronotum as long as vertex, more than half of its length within the curve of the vertex. Elytra, claval veins but slightly curved apically, usually a cross nervure from outer one to suture and often several irregular ones between the veins, outer anteapical cell usually with one cross nervure to the costa, sometimes several, costal margin with numerous, indistinct, almost equidistant nervures which are perpendicular to the margin.

Colour: almost uniform dull yellow, the anterior margin of vertex pale, faintly margined with brown. Elytra with oval light spots, which are milky on clavus and subhyaline white on corium; the three pairs along the sutural margin are very regular. Below pale yellow.

Genitalia: ultimate ventral segment of female twice wider than long, posterior margin rounding, variably trisinate either side of a narrow median incision; the inner pair of lobes usually largest, lateral angles rounding, disc with a dark spot, pygofer short, strongly inflated in the middle. Male valve small, bluntly triangular; plates rather broad, the basal half rounding, apical half triangularly narrowing to the blunt tips, two and one-half times longer than valve, the flat lateral margins separated from the convex disc by a dark line.

Described from numerous specimens from Rifle, Ridgway, Dolores and Durango, Colo. The quadrangular cells along the costa will readily separate this from any described form.

SCAPHOIDEUS FUMIDUS, n. sp.

Resembling *blandus* in form and size. Colour rich testaceous brown, the margins of vertex and pronotum and apex of elytra white. Length, 5 mm.; width, 1.5 mm.

Vertex right-angled, slightly shorter than its basal width, lateral margins slightly rounding, disc flat or slightly transversely depressed on the middle; outline of face as seen from the side straight, front rapidly widening above antennal pits, regularly narrowing below; clypeus short, constricted in the middle, genæ broadly margining the loræ below. Pronotum slightly longer than vertex. Elytra rather long and narrow behind; outer claval vein nearly straight, venation obscured by the deep colour, except in the apical cells, nodal vein arising from beyond the middle of the outer anteapical cell.

Colour: rich testaceous brown, vertex lighter, the lateral margins of vertex and pronotum and the costal margin of elytra at base creamy white, the apex of corium from just beyond the clavus and including all the apical cells and the apices of the two outer anteapical cells, subhyaline white. Sometimes a few oval white spots in the testaceous portion of elytra. Face and below pale creamy yellow.

Genitalia: ultimate ventral segment of female with a broad, triangular, median notch, either side of which there is a broad rounding lobe which slopes away to a small triangular lobe next the lateral angle;

male valve small, not as long as the ultimate segment, roundingly triangular ; plates narrow, long, triangular, their apices acute.

Described from ten specimens from Rifle, Dolores and Durango, Colo. The white margins anteriorly and the sharply defined tip to the elytra against the rich ground colour render this an easily recognized species. The general shape and colour suggest the genus *Platymetopius*, but the shorter vertex and the face characters place it with *Scaphoideus*. Such species as this weaken generic characters and at the same time help us in that they show affinities.

PHLEPSIUS VANDUZEI, n. sp.

Form and general appearance of *cinereus*, but much larger ; stouter built than even *nebulosus*; grayish cinereous, with a trilobate commissural line. Length, 8 mm. ; width, 2.75 mm.

Vertex very bluntly conical, one-fourth longer on middle than against eye, three-fifths the length of the pronotum, no visible line between it and front ; front not quite as long as its basal width, the apex one-third the width at base ; clypeus long, wedge-shaped, broadest below ; pronotum two and one-third times wider than long. Elytra broad, longer than the body, compressed before the flaring apex ; claval veins sometimes tied across.

Colour : dirty white, sometimes a pale yellow wash on vertex and pronotum. Vertex with a distinct round black spot on the middle of either side at the base, a few irregular dark vermiculations anteriorly, omitting a broad median line which extends down the front ; numerous short arcs on front, a spot on clypeus, a pair on loræ, another pair just under eyes, fuscous. Pronotum and scutellum with very faint markings, elytral veins yellow and fuscous ; between them the membrane is very finely, sparsely, and somewhat irregularly vermiculate, omitting a broad commissural line, which is divided into three lobes by the apices of the claval nerves. The outer apical and two costal veins often very much infuscated, the spaces between clear.

Genitalia : ultimate ventral segment of the female appearing only as a narrow strip along the pleura on either side ; in its place is a thin membrane shaped almost like the segment in *apertus*, with its rectangular median excavation, and showing beyond its posterior margin the rounded apices of the plates, near the middle line, and the rounding lobes of a second membrane near the lateral angles ; male valve triangular, the apex bluntly roundingly produced ; plates broad at base, roundingly triangular,

their apices produced, compressed, slightly divergent; disc, convex, inflated, a few appressed hairs along the margin; plates equalling the pygofer, nearly five times the length of the valve.

Described from a pair taken at Rifle, Colo., by Mr. E. P. Van Duzee, and two females taken at Grand Junction the next day by the author. This large species is strikingly distinct in form, colour and genitalia, and it gives me great pleasure to name it after the man who has in the past so carefully worked out this genus for us, and whose energy and "Kansas umbrella" taken together did so much to make this mountain trip both pleasurable and profitable to the author.

PHLEPSIUS EXTREMUS, n. sp.

Very small, oval, depressed, with a flat, thick margined vertex; resembling *decorus* and *areolatus* in general appearance, but much smaller. Smaller than *ovatus*, head as wide as the pronotum. Length, ♀ 4.5 mm., ♂ 4 mm.; width, 1.5 mm.

Vertex flat, over three-fourths the length of the pronotum, over half longer on middle than at eye, not quite twice wider than long, the anterior margin thick, angle with front acute; front broad, nearly flat, longer than wide. Elytra short, oval, claval veins distinct.

Colour: milky white, heavily irrorate with dark fuscous so that the general colour is dark without the reddish or brownish tinge so common in this genus; vertex very heavily irrorate, omitting a narrow margin and median line. Pronotum with large olive brown spots along the anterior margin as in *decorus* and *areolatus*. Elytra with numerous supernumerary veins and reticulations, irrorations almost obsolete except in a few dark spots around the apex and along the costa, one or two near the apex of clavus and two very distinct ones between the sectors of the corium. Front very heavily irrorate with brownish fuscous, rest of face and legs lighter.

Genitalia: ultimate ventral segment of the female twice the length of the penultimate, the lateral angles broadly, roundly produced, between these the margin is roundly emarginate with minute angular teeth at the bottom. In the natural position of the segment it appears to be angularly emarginate almost from the lateral margins; male valve very small, broad and short, about one-fourth the length of the ultimate segment; plates triangular, their apices hardly acute, a little longer than the ultimate segment.

Described from two males and two females, three from Rifle and one

from Durango, Colo. One Rifle specimen from Mr. Van Duzee. This is as short as *albidus*, but much broader, and is quite distinct structurally from any other species with a flat vertex and a broad head.

PHLEPSIUS DENUDATUS, n. sp.

Resembling *ovatus*, but broader and shorter. Even lighter coloured than *albidus*. Head broader than thorax. Form stout. Length, 4 mm.; width, 2 mm.

Vertex blunt, rounding, twice wider than long; front broad, about one-fifth longer than wide, clypeus enlarged at apex. Pronotum very short, but one-third longer than vertex, lateral margin scarcely apparent. Elytra short, broad, flaring behind, giving the insect a square-set appearance. Venation very indistinct, somewhat variable.

Colour: milky white, very sparsely spotted and irrorate with fuscous. Vertex with a pair of round spots just inside the eyes; within and back of these a pair of oblique dashes, fuscous. Pronotum with a pair of fuscous spots in a line with the inner margin of the eye on either side, sometimes a row of fuscous markings inside of these. Scutellum with a pair of triangular spots within the basal angles and a smaller pair of round ones on the disc. Elytra with three pairs of equidistant approximate spots along the suture, the middle pair the largest, and a number of spots along the costa, black. Sometimes these are absent except the large pair on the suture, and a spot opposite the antepical cells on either costa. Veins pale yellow, indistinct. Face and all below dirty white.

Genitalia: ultimate ventral segment of the female about twice as long as the penultimate, the lateral angles feebly, angularly produced, the margin between them very slightly rounding, with a small semicircular median emargination; male valve small, triangular; plates broad, triangular, as long as the ultimate segment.

Described from numerous specimens from Grand Junction, Colo. (V. D. and the author.) This is another of the "white" Phlepsids, which seems to be strictly south-western in distribution. In structure it resembles *Vanduzeei*, but in size and colour it is very different.

(To be continued.)

I desire to acknowledge the Society's indebtedness for a perfect pair of *Plusia aeroides*, from Mr. C. H. Young, Hurdman's Bridge, through Dr. Fletcher. A very rare species in this district.

J. ALSTON MOFFAT, Curator.

REVISION OF THE GENUS CATOCALA.

BY G. H. FRENCH, CARBONDALE, ILL.

On page 191, Vol. XXXII., of the CANADIAN ENTOMOLOGIST (1900), Dr. Grote describes a new species of Catocala from Texas, *C. moderna*, related to *C. viduata*. If we place this as No. 7 in our list of the former article, and push the rest one number forward, it will bring *C. relicta* No. 21 instead of No. 20. Following this with the "red wing" species, I would arrange this group as follows:

- | | |
|--------------------------|--------------------------|
| 22. Cara, Guenee. | 45. Hermia, Hy. Edw. |
| var. Sylvia, Hy. Edw. | 46. Cassandra, Hy. Edw. |
| var. Carissima, Hulst. | 47. Briseis, Edw. |
| 23. Amatrix, Hubner. | 48. Faustina, Strecker. |
| var. Nurus, Walker. | var. Zilla, Strecker. |
| 24. Concumbens, Walker. | var. Verecunda, Hulst. |
| var. Diana, Hy. Edw. | var. Allusa, Hulst. |
| var. Hillii, Grote. | 49. Irene, Behr. |
| 25. Californica, Edw. | var. Virgilia, Hy. Edw. |
| var. Perdita, Hy. Edw. | var. Volumnia, Hy. Edw. |
| var. Cleopatra, Hy. Edw. | var. Valeria, Hy. Edw. |
| 26. Hippolyta, Hy. Edw. | 50. Parta, Guenée. |
| 27. Arizonæ, Grote. | var. Perplexa, Strecker. |
| 28. Luciana, Hy. Edw. | var. Petulans, Hulst. |
| <i>Nebraska</i> , Dodge. | 51. Coccinata, Grote. |
| var. Somnus, Dodge. | Sinuosa, Grote. |
| 29. Marmorata, Edw. | var. Circe, Strecker. |
| 30. Babayaga, Strecker. | 52. Aholibah, Strecker. |
| 31. Aspasia, Strecker. | 53. Violenta, Hy. Edw. |
| var. Sara, French. | 54. Verilliana, Grote. |
| 32. Juntura, Walker. | var. Ophelia, Hy. Edw. |
| var. Walshii, Edw. | var. Votiva, Hulst. |
| 33. Unijuga, Walker. | 55. Ultronia, Hubner. |
| 34. Beaniana, Grote. | var. Celia, Hy. Edw. |
| 35. Augusta, Hy. Edw. | var. Mopsa, Hy. Edw. |
| 36. Rosalinda, Hy. Edw. | var. Adriana, Hy. Edw. |
| 37. Pura, Hulst. | var. Herodias, Strecker. |
| 38. Semirelicta, Grote. | 56. Ilia, Cramer. |
| 39. Meskei, Grote. | var. Zoe, Behr. |
| 40. Stretchii, Behr. | var. Uxor, Guenée. |
| 41. Portia, Hy. Edw. | var. Osculata, Hulst. |
| 42. Mariana, Hy. Edw. | 57. Innubens, Guenée. |
| var. Francesca, Hy. Edw. | var. Flavidalis, Grote. |
| 43. Jessica, Hy. Edw. | var. Hinda, French. |
| 44. Grotiana, Hy. Edw. | var. Scintillans, Grote. |

The three forms, *Babayaga*, *Aspasia* and *Walshii*, have been more or less confused. While at a casual glance they are very close, still I have no trouble in separating them. The first I have seen from Texas and Arizona. The fore wings have a brownish velvety appearance, the s. t. line not lighter than inside the t. p. line, the t. p. and t. a. lines dark brown with a mesian transverse and s. t. brown shade. The mesian band of the hind wings is very narrow, only slightly expanded in the middle, abruptly bent at the posterior and not reaching the internal margin.

Aspasia has the ground colour of a slight bluish tinge, the lines of a deeper brown, almost black, the mesian and s. t. shades more distinct brown, the s. t. line almost or quite concolorous with the ground colour. The mesian band of the hind wings is from a quarter to a third wider than in *Babayaga*, and often nearly reaches the internal margin by a shade.

In *Walshii* the ground colour of the fore wings is much as in *Aspasia*, but the s. t. line is white or whitish and the shades are less brown, and the mesian band of the hind wings is nearly twice as wide as in *Babayaga*.

I have seen *Babayaga* from Texas and Arizona; *Aspasia* from Arizona and Colorado; *Walshii* from Arkansas, Missouri and Illinois; and what may be *Junctura* from Arkansas. I have not before me Walker's description, and hence do not know the locality he gives for the specimen he described. If I know the genuine *Junctura* it has more or less white through the middle of the fore wings, as Grote says in one of his descriptions, somewhat simulating *Unijuga*, with the mesian band of the hind wings wider than in either of the first three forms. I have seen such specimens from the East, and one or two from Arkansas in the collection of Mr. T. C. Poling, of Quincy, Ill., approximate the eastern forms. On the strength of this I have put *Walshii* as a variety of *Junctura*.

As to the specific status of these forms I have not much to say. I have taken *Walshii* here in Southern Illinois for more than 20 years, and have never found one intergrading toward what I have called *Junctura*, and hence have not shared Mr. Grote's idea that it was a synonym of *Junctura*, and only place it as a variety for the reason given above. Nor have I seen any intergrading toward *Aspasia* or *Babayaga*. It is possible that these four forms are but one species, but it seems to me better to let them stand till by breeding they are proven to be one.

In another species, *Stretchii*, I found by breeding that there was considerable variation in the colour of the fore wings, but the mesian band

of the hind wings and the main markings of the fore wings were constant. Hence I separate this without hesitation from all other forms.

It is commonly conceded now, I think, that *Nebraska*, Dodge, is a synonym of *Luciana*, Hy. Edw. I have not seen *Portia*, *Jessica* and *Cassandra*, and place them where they have been placed, as I have only descriptions of these species. From my own observation I should be inclined to separate *Circe* from *Coccinata*, as I take only the first form here, but the size given in the descriptions and what I have seen in other collections lead me to think that they are but forms of one species.

A NEW CANADIAN TINEID.

BY AUGUST BUSCK, WASHINGTON, D. C.

Anacamptis lupinella, n. sp.

Antennæ bronzy black with white annulations, slightly serrate, especially towards the tip.

Labial palpi long, smooth, recurved; second joint somewhat thickened, with appressed scales, dark ochreous brown; terminal joint longer than second, acicular, dark brownish, with tip black.

Maxillary palpi obsolete. *Tongue* stout, scaled.

Eyes [in the dry specimen] dark brick red.

Face light brown, with dark purple reflexions.

Head and *thorax* concolorous with fore wings, purplish black, with a satin lustre and with numerous evenly distributed bluish white scales, only visible under a lens.

Three varieties are before me.

Fore wings in some specimens without any markings; in others they have a distinct whitish yellow spot at the beginning of the costal cilia and another similar dorsal spot opposite.

In still other specimens these spots are extended downwards and upwards relatively and meet each other, forming a narrow transverse fascia.

In the two former varieties the fore wings are otherwise uniformly coloured, but in the last moth the outer half of the wing is suffused with irregular longitudinal streaks of light brown.

Presumably all gradations of these types exist.

Under side of fore wing uniformly bluish black, without trace of the fascia or spots.

Hind wings a little broader than fore wings, termen not sinuate, black, with strong purple reflexions.

Venation typical: Fore wings: 12 veins, 7 and 8 stalked, the others separate. Hind wings: 8 veins, 3 and 4 connate, 6 and 7 connate.

Entire body and legs purplish black.

Alar expanse 14 mm.

Habitat.—High Park, Toronto, Canada.

U. S. National Museum, type No. 5351.

Described from three perfect female specimens, reared from *Lupinus perennis* and presented to the National Museum by Dr. J. Fletcher.

The insect is in several respects an interesting one. It belongs to that group of *Anacamptis*, Curtis [*Tachyptilia*, Hein., *Meyrick*], which in coloration suggests strongly the *tanionella* group of the genus *Aproærema*, Durrant [*Anacamptis*, *Meyrick*].

It is nearest *Anacamptis* (*Gelechia*) *agrimoniella*, Clemens, and has not only the pattern but the leguminous food plant of *Aproærema*, while having the wing form and venation of *Anacamptis*; indicating in connection with the other species in this group the correlation of the two genera.

Its general habitus suggests very much the genus *Trichotaphe*, Clemens, to which genus I took it to belong, before examining closely the venation.

The insect is one proof of the close relationship between *Anacamptis* and *Trichotaphe*, which in their nearest related forms only differ in the single point: veins 2 and 3 in fore wing being stalked in *Trichotaphe*, while they are separate in *Anacamptis*.

Anacamptis tristrigella, Walsingham, described as *Gelechia*, and *Anacamptis levipedella*, Clemens, described as *Strobisia*, belong in this immediate group.

The following description of the full-grown larva is by Dr. James Fletcher, Ottawa:

Larva.—Shape as in many other Tineids, almost cylindrical; head and 2nd segment slightly smaller than rest of body; segments 3 to 5 very little smaller than segments 6 to 12. Length 13 mm., extended 15 mm. Width, segments 6 to 12, 2 mm. wide; segment 2, 1.40 mm., segments 3, 4 and 5, 1.60 mm. Head 1 mm. wide, flattened and rather shorter than wide; horizontal, slightly oblique, shining, bearing a few slender hairs; deeply indented at apex, testaceous, darkened along posterior margin and bearing a black blotch at lower posterior angle of each cheek; ocellar field black; length .90 mm. Thoracic shield large, conspicuous, concolorous with head; width 1.30, depth .50 mm.; almost straight in front,

rounded posteriorly. One-third of lower margin edged with black and terminating with a black point at lower anterior angle; posterior margin swollen and bearing on each side of median line 3 small black piliferous tubercles. There are also 3 others on front margin. Tubercles of body black, bearing slender fawn-coloured hairs, normally placed, consisting of 3 dorsal, 3 substigmatal and 1 ventral series. No. i. anterior, and sub-dorsal, half the size of ii. and iii.; No. ii. posterior, and supralateral; No. iii. median, immediately above the minute black spiracles, slightly larger than ii.; on segments 7 to end enclosing the spiracles in their lower margins; No. iv. twice its width from spiracles and immediately below them; No. v. below and in a line with No. ii.; the tubercles of series No. vi. form a line running from base of thoracic feet to base of anal prolegs; the tubercles of this series are more than twice longer than high, being merely short black chitinous dashes bearing 2 or 3 bristles, except on segments 5, 6, 11, 12 and 13, where they are dots. Substigmatal series, tubercles iv., v., vi., are all of the same size as ii., larger than i., smaller than iii. Medio-ventral series of very small tubercles, one on each side of every segment, beneath. On segment 2 a large black oval tubercle (No. v.), beneath thoracic shield and anterior to the spiracle, and a tubercle at base of thoracic foot (No. vi.). On segments 3 and 4, tubercle No. i. is wanting, and as usual Nos. ii., iii. and v. are arranged in a curved line across the segments; No. v. anterior to the other two; vi. is at base of thoracic foot, and iv. immediately above it, but higher up than v.

General colour of larva dark olive green above, paler below, dorsal vessel showing as a dark stripe. Thoracic feet testaceous, blackened at tips, with a narrow chitinous black fold in front and another behind at the base of each. Prolegs concolorous with body; claspers rusty.

Cocoon, slight, among the leaves. Pupa chestnut brown, length 6.50 mm. by 1.75 mm. at widest part. Thorax and abdomen bearing a few slender bristles, which are most numerous towards the cremastral end. Cremastral hooks long and slender. Whole body covered with a very short fulvous velvety pile.

These larvæ were found in considerable numbers among leaves of *Lupinus perennis* kindly sent from High Park, Toronto, by Mr. Allan Kinghorn. Each larva made a tent by tying two or three of the leaflets loosely together. They were almost full-grown when received, and the first pupated on the 10th of June. Pupal period about eight days. Eight moths were reared, all females. There was considerable variation as to markings, the transverse fascia being obliterated in some specimens, but more or less apparent in most.

CYPHODERRIS MONSTROSA.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

From time to time during the last two or three years, Dr. James Fletcher has sent me specimens of a curious Locustarian taken at Banff, Alberta, by Mr. N. B. Sanson, curator of the Government museum in the National Park at that place. The specimens were all wingless and apparently immature females, but quite unlike anything known from that region. A study of their structure showed that they belonged to the Stenopelmadini and were most nearly allied to the genus *Cyphoderris*. Now, *Cyphoderris*, though described by Uhler thirty-six years ago, is a rare creature and was on record from only two localities, Oregon and Wind River, Wyo., and only males had hitherto been taken. The probability that these immature and wingless females belonged with the winged males appeared to me, however, so great that in my recent catalogue of North American Orthoptera I recorded the species given in the title above as found in Alberta.

Nevertheless, I had misgivings and asked Dr. Fletcher to obtain mature specimens to make sure. By his urgency, Mr. Sanson has forwarded separately this last autumn two mature females *alive*, the first of which Mr. Fletcher sent to me. These were in no respect different from the immature specimens except in size and in slight traces of wing-pads beneath the pronotal shield; while in the appearance of the pronotum they differed so greatly from the male of *Cyphoderris* that I was as much at a loss as ever; for the male *Cyphoderris* has the posterior half of the pronotum so hunched and enlarged as to be almost a half broader posteriorly than anteriorly; this is to give room for the coarse and bellied tegmina, which it overhangs, which are considerably longer than the pronotum, and nearly the whole of whose dorsal surface is made up of a coarse stridulating organ. But the females sent had a pronotum of nearly uniform diameter and practically no wings. Only by securing a male from the same region or females from Oregon or Wyoming could the question really be decided whether these represented closely-related genera or the same or nearly-allied species. The matter has just been definitely settled by the receipt of a male from Banff, kindly sent by Mr. Sanson from his collection, which cannot be separated from the Oregon types in my possession. Mr. Sanson responded generously to the

demands upon him; he obtained his specimens under logs and stones where he had placed old bones as a bait. They appear to be scarce, and he has so far secured but one male.

The occurrence of such a form so far north is of particular interest, for *Cyphoderris* belongs to a group of *Anostostomata* (a subdivision of *Stenopelmatini*) which is purely American, but mainly tropical, its northernmost allies being found in Mexico. Moreover, the Old World species and genera of *Anostostomata* are from the southern hemisphere exclusively.

Both Mr. Fletcher and I kept our females alive for nearly a month, feeding them chiefly on apples, of which they partook rather sparingly. They were very sluggish, as seemed fit for such heavy-bodied creatures, and could scarcely jump at all, not above half an inch at a time, and were more active by night than by day. Whether eggs are laid in the autumn or spring is uncertain; the former would seem probable from their dying in captivity before November, the latter from the fact that when captured in September the thermometer stood at 19° F. I gave my specimen no water, but Mr. Fletcher gave his some from a brush, which she drank, but, he writes me, "if I push the brush too assiduously she turns over on her back and bites and kicks savagely and then lies perfectly still." After death the abdomen contracts greatly.

Taking advantage of possessing a living specimen, I took notes of the colouring, etc., from which the following description of the female is taken:

Head above the antennæ bronze black, longitudinally marked with pallid luteous; genæ and face below the antennæ pale lilac, excepting the clypeus and labrum, which are pale lemon yellow, the whole marked with blackish; palpi pallid, feebly infuscated, especially the maxillary pair, in stripes and apical marginings, the extreme apex of apical joint pallid; basal joint of antennæ pallid, with broad basal and narrow subapical fuscous annuli, the remaining joints bronze black; eyes castaneous.

Pronotum subcylindrical, subequal, very feebly constricted just in advance of the middle, dull luteous with a nacreous sheen, the posterior edge and lower margins of the lateral lobes flavous or flavescent, the whole heavily and massively marked, especially in the constricted region, with very dark glistening bronze green, the whole surface, whether dark

or light, sprinkled very sparsely and very inconspicuously with luteous dots. Sternal parts of thorax luteous, more or less infuscated. Tegmina reduced to minute membranous testaceous pads, concealed beneath the pronotum. Coxæ and trochanters blackish fuscous; femora luteo-testaceous, the whole apex and a broad longitudinal median band on the outer side subpiceous; tibiæ pallid luteous, with a piceous stripe following the upper lateral spinigerous margins, heavier in basal than in apical half; the fore pair with one spine above on inner margin, besides an apical one, none on the outer margin, below with two or three spines on each side, besides the apical one; the middle pair with no spines below, two or three on either side above, besides the apical one; and the hind pair with no spines below and six or seven on either side above, besides the apical one; the spines pallid or luteous tipped with black, excepting the apical spines, which are almost wholly fuscous; tarsi very pale red beneath, pallid above, edged apically with fuscous.

Abdomen very plump, deeper than broad, having above the same colours as the pronotum, the luteous nacre forming the base, and the bronze green, somewhat embrowned, confined to the apical margins of the segments in an irregular edging; sides of abdomen between the dorsal and ventral scutes pale brown, sparsely sprinkled with pallid dots, the spiracles glistening bronze.

Length of body, 21 mm.; pronotum, 8 mm.; breadth of same, 7 mm.; length of antennæ, 25 mm.; hind femora, 11 mm.; hind tibiæ, 10.5 mm.; hind tarsi, 7 mm.

[Mr. Sanson states that these insects are by no means common at Banff. The first specimen he acquired was found in the basement of the Canadian Pacific Hotel, by Miss Adams, of Winnipeg; Mr. W. C. McCalla, of St. Catharines, Ont., took two immature specimens among the fir boughs used as a bed in his camp. One specimen was given to Dr. White, of Banff, by Mr. George Paris, of the same place. Mr. Sanson caught two mature females, one by placing some biscuits and brown sugar under a sheet of botanical drying felt near one of the summer residences off Tunnel Mountain Rd., near the place where the perfect male referred to above was taken; the second was found under a log where a bone had been placed as a bait; and the last specimen found was brought to him by a member of a camping party, who had it for a few days and brought it in alive. In all, seven specimens have been secured.—ED.]

NOTES ON SOME ONTARIO ACRIDIIDÆ.—PART IV.

BY E. M. WALKER, TORONTO.

(Continued from Vol. XXXI., page 36.)

- 16a *Spharagemon collare*, Scudd., race *Wyomingianum*, Thomas.
Oedipoda Wyomingianum, Thom. Ann. Rep. U. S. Geol. Surv.
 Terr., V. 462 (1872).
Spharagemon Wyomingianum, Scudd. Proc. Boston Soc. Nat.
 Hist., XVII., 479 (1875).
Spharagemon oculatum, Morse. Proc. Boston Soc. Nat. Hist.,
 XXVI., 232 (1894).
Spharagemon collare, race *Wyomingianum*, Morse. Psyche, VII.,
 298 (1895).

In September, 1899, I found this species fairly plentiful on sand dunes, in Rondeau Provincial Park, Kent Co., on the shore of Lake Erie. The sand dunes occupy a considerable area there, and in some places near the lake shore are thinly wooded with red cedar (*Juniperus virginianus*). It is here that I found this locust in the largest numbers, though they were also to be found further away from the shore in open places in oak woods; only, however, where the soil was sandy. In another part of the Park, where the trees were mostly pines, *S. bolli*, Scudd. was common, but I never found the two species together. In the juniper groves near the beach, *S. Wyomingianum* was in company with *Trimerotropis maritima* which occurred in great numbers, and was found also, and still more abundantly, on the open beach, where *S. Wyomingianum* did not venture.

The hind tibiæ of my specimens vary from pale yellow to orange, none being decidedly red. They are dated Sept. 14 and 15, 1899.

This is the first notice of this species in Ontario, and of the race *Wyomingianum* in Canada. I have found the typical *collare* common from Manitoba to British Columbia.

Encoptolophus sordidus, Burm.—Until the last two or three years this species was quite rare in Toronto, which was about its northern limit in that part of Ontario. In the fall of 1897 I saw quite a number in some of the dry, sandy hillsides in High Park, and in 1898 they were much more numerous, and were even seen about the city, in open grassy places. This summer they were common everywhere, their crackling stridulation being heard in almost every field. They have now extended to Lake Simcoe, if not further, for I found them in small numbers, this summer, at De Grassi Point. The species seems to be spreading northward.

21a. *Podisma glacialis*, Scudder.

Pezotettix glacialis, Scudd. Boston Journ. Nat. Hist., VII., 630-631 (1863).

Pezotettix borealis, Glov. (nec. Scudd.). Ill. N. A. Ent., Orth. (1872).

Podisma glacialis, Scudd. Rev. Melanopli, p. 98 (1897).

While collecting at North Bay, Lake Nipissing, on Sept. 12, 1900, I took 10 ♂s and 5 ♀s of this insect. They differ slightly from the typical *glacialis* of the White Mountains, approaching *P. variegata* to a slight degree in several points. Having compared them with two pairs of typical *glacialis* from New England, and noticing these peculiarities, I sent a few specimens to Mr. Scudder, who says that they are "without doubt *glacialis*, though varying slightly towards *variegata*, especially in the (feebly) banded hind femora." He also notes that "the cerci of the ♂ are more smoothly rounded at the apex and the furcula shorter than in typical *glacialis*." As compared with my New England specimens, they also differ in having in every case distinctly longer antennæ and hind femora, and in the more prominent eyes; in all of these characters approaching *variegata*.

In the White Mountains Mr. Scudder has found this species on the dwarf birch (*Betula nana*), while Mr. Morse has found it most common in the various species of *Vaccinium* characteristic of mountain tops, and on dwarf cornel. Most of my specimens were found on red raspberry bushes, like *P. variegata*, at Lake Simcoe, but many were also seen on alders. Unlike *variegata*, they are not confined to swamps, but are also found in comparatively dry places.

I have two immature males of a *Podisma*, probably this species, collected by Mr. G. M. Stewart on the portage between Lakes Esnogami and Kabinakagami, in Northern Ontario. This portage is across the Height of Land, and is a little further north than the species has hitherto been recorded. One of the specimens is almost full-grown, and in both the hind femora are pale yellow, strongly banded with black. They are dated July 12 and 13, 1900.

26a. *Melanoplus extremus*, Walk.

Caloptenus extremus, Walk. Cat. Derm. Salt. Brit. Mus., IV., 681 (1870).

Pezotettix junius, Dodge. CAN. ENT., VIII., 9 (1876).

Caloptenus parvus, Prov. Nat. Canad., VIII., 110 (1876).

Melanoplus extremus, Caulfield. Rep. Ent. Soc. Ont., XVIII., 71 (1886).

I have a single female of the short-winged form of this grasshopper, collected by Mr. G. M. Stewart in a muskeg ten miles west of the portage between Lake Kabinakagami and the Matawishguia River.

At the same spot Mr. Stewart also took two males of *M. islandicus*, Blatchley, an adult and a nymph. These three specimens are dated Aug. 18, 1900. On the portage between Lakes Esnogami and Kabinakagami two mature females of *M. islandicus* were taken, July 15, 1900.

29a. *Melanoplus bivittatus*, Say.

Gryllus bivittatus, Say. Journ. Acad. Nat. Sc. Philad., IV., 308 (1825).

Caloptenus bivittatus, Uhler (pars), Say. Ent. N. A., ed LeC., II., 238 (1859).

Melanoplus bivittatus, Scudd. (pars), Hitchc. Rep. Geol. N. H., 1, 376 (1874).

I took a single ♀ of this grasshopper while collecting at North Bay, on Sept. 12, 1900. This is the true *bivittatus*, not the common species with red hind tibiæ, usually so-called, which is *M. femoratus*, Burm. The hind tibiæ of my specimen are dark bluish-green above at base, gradually passing into pale greenish-yellow at apex.

Although I spent some six hours collecting at North Bay, and searched carefully for both *M. bivittatus* and *M. femoratus*, I obtained but one specimen of each, both females. I expected to find *femoratus* common, as it is abundant in Muskoka, and has been taken as far north as Hudson's Bay.

M. bivittatus is an interior and Western form, so that its occurrence in Northern Ontario is of some interest.

Melanoplus punctulatus, Uhler.—During the last two seasons I have found this insect quite plentiful locally, though I spoke of it in a former paper (CAN. ENT., XXXI, 35) as one of our rarest Acridians. Until then I had never seen the male, but in the season of 1899 I found about a dozen of them, and this season I have seen more than one hundred. I found them most numerous on dead stumps and logs, in a wood of second-growth white pine, at De Grassi Pt., Ont. They were sometimes seen on the trunks and branches of living trees, but most often on the stumps and fallen trunks of the oid forest, and on the pine rails of a snake fence enclosing the wood. They were found only on the borders and more open parts of the woods, where they were to be seen upon almost every stump. I have seen ten ♀s on a single stump. It is in these dead stumps and logs that the females deposit their eggs, in which operation I have

observed them repeatedly. The female chooses a crack in the wood or an old beetle-boring of suitable size, and lowers her abdomen down this, sometimes nearly as much as an inch. Sometimes when the hole is of large size, only the head and legs of the insect can be seen above it. Unlike *Chlocaltis conspersa*, the female of *M. punctulatus* apparently never bores herself unless merely to make her way through any loose rubbish that might be obstructing the hole. She generally chooses sound or only partly decayed wood.

I managed to obtain several fragments and one complete packet of eggs. The latter was fixed by the cement substance at its lower end to the wall of a beetle-boring three-eighths of an inch in diameter. It was attached at a distance of about three-quarters of an inch down the hole, and except at the lower end, which was imbedded in a depression in the wall, the packet was quite free. It was covered with a rather thick coating of a porous or vesicular cement substance, which also filled all the spaces between the closely-packed eggs. The latter were twenty-three in number, and their arrangement was in general in a longitudinal direction, the anterior ends pointing towards the free end of the packet, but was otherwise irregular.

The eggs are 4 to 4.8 mm. long, elongate-elliptical in form, finely and densely punctate, reddish-brown. There is a slightly impressed line encircling the egg close to its posterior end.

M. punctulatus has been fairly common also at Toronto this season. I found a pair on a white oak tree, the others on pine.

A NEW CECIDOMYIID ON GUTIERREZIA.

BY T. D. A. COCKERELL, E. LAS VEGAS, N. M.

Asphondylia gutierrezia, n. sp.

♀.—Length slightly over 3 mm.; antennæ pale brown, 2 + 15 jointed, the first two joints darkened; eyes united on vertex; thorax reddish-brown, dorsally shining, naked, with four very thin longitudinal bands of hairs; femora pale brown, tibiæ and tarsi darker; wings well fringed with hairs; abdomen nearly naked, bright red, ovipositor and a dorsal apical patch white; ovipositor moderately long.

Pupa shell white, the anterior part faintly tinged with brown.

Gall a pale green fusiform or suboval swelling in the flower-head of *Gutierrezia sarothra*, about 7 mm. long and 3 mm. broad.

Hab.—Las Vegas, New Mexico; collected by Wilmatte P. Cockerell; flies emerging October 31.

The colours of *A. gutierrezia* are described from fresh material; dried examples will not be so bright.

THE GENERIC NAMES VATES AND THEOCLYTES.

BY JAMES A. G. REHN, PHILADELPHIA.

Recently the writer made the statement (Trans. Amer. Ent. Soc., XXVII., p. 87) that the generic name *Theoclytes* was a synonym of *Vates*, the latter being the older by one year. A further examination has shown that the matter should have been examined closer. Three generic names are involved—*Vates*, Burmeister; *Theoclytes*, Serville, and *Pseudovates*, Saussure—the included species of each being as follows:

Vates, Burmeister.*V. cnemidotus*, Burmeister = *subfoliata*, Stoll.*V. orbis*, Illiger.*V. macropterus*, Stoll. } *Zoolea macroptera*, Stoll.*Theoclytes*, Serville.*T. foliata*, Licht. = *subfoliata*, Stoll.*T. undata*, Fabricius = *Popa undata*, Fabricius.*T. chlorophæa*, Blanchard.*Pseudovates*, Saussure.*P. tolteca*, Saussure.

The type of the genus *Vates* is therefore *subfoliata*, Stoll., the other two included species (synonymous) having been removed by Serville to his new genus, *Zoolea*, in 1839. As the species *subfoliata* was used by Burmeister (and is by elimination the type of the genus), it must be barred from consideration in the genus in which it was placed by Serville. The second species, *undata*, having been removed to another genus, the third, *chlorophæa*, must stand as the type. The last genus, *Pseudovates*, of Saussure, was based simply on *tolteca*, which is congeneric with *Vates*, and therefore the two are synonymous, unless the two types can be separated subgenerically, in which case the name *Pseudovates* is available for one. The revised generic names stand as in the following table:

Vates, Burmeister. Type, *V. subfoliata*, Stoll.—— *Pseudovates*, Saussure.*Theoclytes*, Serville. Type, *T. chlorophæa*, Blanchard.

While a few authors have followed almost the same pattern as this, the general tendency has been to distort the names by placing them to suit their fancy or their particular system of classification.

TWO NEW BLIND BEETLES, OF THE GENUS *ADRANES*,
FROM THE PACIFIC COAST.

BY H. F. WICKHAM, IOWA CITY, IOWA.

The species of *Adranes* are to be looked for in nests of ants belonging to the genus *Lasius*. They are helpless creatures, lacking eyes and with much reduced mouth-parts, dependent probably upon the ants for their supply of food. They are carefully attended by their hosts, to whom they give requital in the form of a secretion, much appreciated by the ants, which collects on certain patches of hair situated on the tips of the elytra and on the base of the abdominal dorsum. The antennæ are much modified, consisting of only two joints, the second of which is very large and heavy, varying in form in different species.

Until recently but two species were known, namely, *A. cæcus*, Lec., from Pennsylvania, Georgia and Illinois, and *A. Lecontei*, Brendel, from the Mississippi, Potomac and Ohio* valleys. Some time ago I received from the Rev. Geo. W. Taylor a specimen which appeared to belong to a third species. It had been captured by him in an ants' nest near Nanaimo, Vancouver Island. My trip to the Pacific Coast has given additional specimens of the same kind, and also of a fourth species which is very distinct from any of the others.

While all of the *Adranes* are of much the same colour (a peculiar shining reddish yellow) and agree closely in general shape, they nevertheless offer structural characters, particularly in the male sex, which enable us to separate them readily. I regret not to have seen *A. cæcus*, which evidently approaches the form that I have called *pacificus* in size and in some other features. I annex a table which gives in brief the differentials necessary for specific discrimination :

Head cylindrical. Antennæ with second joint narrowed to tip. L.
1.8 mm. *cæcus*, Lec.

Head narrowed behind.

Antennæ with second joint narrowed to tip.

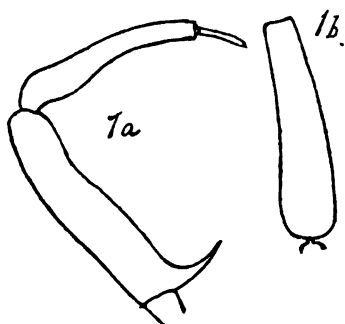
Smaller (2 mm.); middle tibiæ of ♂ not appreciably thickened
near the base. *pacificus*, n. sp.

*Dr. E. Wasmann has also a record of *A. Lecontei* from California. (Krit. Verz. d. Myrmekoph, u. Termitoph, Arthropoden, Berlin, 1894, p. 107.)

Larger (2.5 mm.); middle tibiae of ♂ more slender and strongly thickened near base..... *Lecontei*, Brend.
 Antennæ with second joint cylindrical, not appreciably narrow at tip; middle tibiae of ♂ with a strong tooth about one-third from the tip..... *Taylori*, n. sp.

Figures of the antennæ and middle legs of the males of three of the

above are given, the sketches having been made with the aid of a camera lucida. Care has been taken to get a like point of view in each case. The spine of the middle leg has been figured as part of the trochanter in *A. Lecontei* by Dr. Brendel*, who was misled, I suppose, by the use of imperfect lenses. In specimens of an *Adranes* from Iowa City, determined by him as his *Lecontei*, the spine is femoral in origin, as shown in my figure



(Fig. 1a), to which I have added a sketch of the antennæ (Fig. 1b) for comparison with the others.

The new forms may be described thus:—

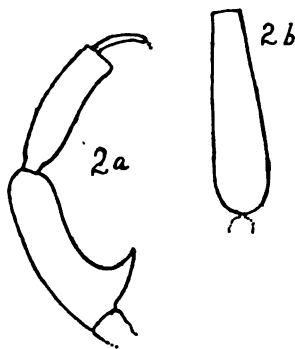
Adranes pacificus, n. sp.—Reddish yellow, less shining than *A. Lecontei* or *A. Taylori*. Above finely punctured, pubescence yellowish, recumbent, coarser than in either of the previously mentioned species and more inclined to form regular lines. Head (in profile from above) broadest just behind the antennæ, thence almost regularly narrowed to base, sides hardly arcuate, frontal margin truncate. Second antennal joint straight, distinctly narrowed to the tip and somewhat thicker in proportion to the length than in *A. Lecontei*. Pronotum resembling that of *A. Taylori*, but the lateral impressions are less deep, and in consequence the sides in front of them appear less bulging; basal fovea naked, deep and almost exactly circular. Elytra at base about equal to the base of the prothorax or very slightly wider, conjointly deeply

*Bulletin from the Laboratories of Natural History of the State University of Iowa, Vol. I., pl. VI., Fig. 3. The same origin is ascribed to this spine in *A. cactus*, l. c. pl. VI., Fig. 5; and p. 221. However, I have not seen the latter species, and make no further comment.

triangularly emarginate, rapidly, slightly arcuately broadening to the tip, each with a tuft of long yellowish hair near the middle of the posterior margin, the exact shape of which is thus concealed. Abdomen above convex, surface more shining than that of the rest of the body, the pubescence long, recumbent, very fine and sparse; arcuation of the juxta-basal portion of the margin more regular and less sudden than in *A. Lecontei*, which it closely resembles in the form of the impressions and foveæ. Body beneath of the same colour as above, scantily pubescent. Legs stouter than in *A. Lecontei* or *A. Taylori*, middle femora of male with a large strong curved basal tooth, middle tibiæ slightly curved, but without strong sinuation or tooth. Length 2 mm.

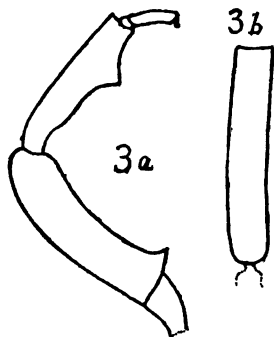
Type, ♂ from Sisson, California, in the Mount Shasta district. Collected by myself in a nest of a pale variety of *Lasius niger*, L. (det. Pergande), under the bark of an old stump, near the end of July, 1900. This beetle is readily distinguished from the other Pacific Coast species by the facies, smaller size and greater opacity. Fig. 2a shows the middle leg of the ♂, Fig. 2b the antenna.

Adranes Taylori, n. sp.—Reddish yellow, shining, above finely punctured and with rather long yellowish recumbent pubescence, which does not conceal the surface nor give the effect of opacity. Head (in profile from above) truncate anteriorly, sides gradually slightly divergent to a point behind the middle, thence rapidly narrowed to base. Antennæ with the second joint cylindrical, not tapering to the tip. Pronotum, broadest about one-third from the base, narrowing anteriorly to about the width of the head and posteriorly to near that of the elytra. Behind this broadest part is, on each side, an oblique impression, while on the median line near the base is a large rounded hairless fovea. Base of elytra equal to or slightly greater in width than that of the prothorax, conjointly deeply triangularly emarginate; rapidly arcuately broadening to apex, each with a tuft of long yellowish hair near the middle of the posterior margin, the exact shape of which is thus concealed. Abdomen above convex, surface more shining than that of the rest of the body, the pubescence rather long,



recumbent and very fine, much sparser than that of the elytra. Width at base (compared with the elytra) less than in *A. Lecontei*, the arcuation of the juxta-basal portion less pronounced. Impression and foveæ much as in *A. Lecontei*. Body beneath of same colour as above, shining, sparsely pubescent. Legs, ♀ unarmed, ♂ intermediate femora with a short stout basal tooth, middle tibiæ sinuate internally and with a strong triangular tooth, as large as that of the femur, at about one-third from tip. Length 2.5 mm.

Type, ♂ from Newport, Oregon; collected by myself in nest of *Lasius niger*, L. (det. Pergandè), under a prostrate log, near the middle of July. Also received from Rev. Geo. W. Taylor, collected by him at Nanaimo, Vancouver Island, in March and April, and to him the species is dedicated in recognition of the value of his entomological and other researches into the fauna of his district.



The middle leg of the male *A. Taylori* is shown in Fig. 3a. It is quite characteristic and will readily distinguish this species from any other thus far known. The shape of the second antennal joint (Fig. 3b) is also peculiar to this insect.

CHANGE OF NAME.

On page 248 of Vol. XXXII. of the CANADIAN ENTOMOLOGIST, I proposed *pruinus* for a species of *Tabanus*. Prof. J. M. Aldrich has kindly informed me that *pruinus* has been used previously by Bigot for a species of that genus. My species is a true *Atylotus*, and Bigot's is placed in *Tabanus* in the strictest sense, but I prefer to change the name of my species to *Ohioensis*. JAS. S. HINE, Columbus, Ohio.

The GENERAL INDEX to the 30 annual Reports of the Entomological Society of Ontario (1870-1899) will be ready for distribution in a few days. Copies will be sent postpaid on receipt of the price—50 cents bound in cloth; 25 cents unbound. Address: Entomological Society of Ontario, 429 Wellington Street, London, Canada.

The
Canadian Entomologist

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No. 2.

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LONDON, ONTARIO.

FEBRUARY, 1901.

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The Canadian Entomologist.

VOL. XXXIII.

LONDON, FEBRUARY, 1901.

No. 2

Queen Victoria.

BORN MAY 24TH, 1819; ASCENDED THE THRONE JUNE 20TH, 1837; DIED JANUARY 22ND, 1901.

The death of our beloved Queen, who has been our sovereign for more than three score years, is to each of her subjects, in whatever part of the world he may be, a loss beyond what words can express. We have all been filled with reverence for her majesty—admiration for her character—and deep affection for her person. Whether we regard her as Empress and Queen in stately dignity—as sovereign ruler over the vast British Empire, inspired with justice, wisdom and truth—as wife and mother living a home life of purity, love and peace, unsullied by any stain,—in whatever aspect we regard her, our feelings, our judgment, are the same. The grief which now wrings our hearts is shared in, and sympathized with, by the nations of the world; everywhere there is the same tribute of respectful sorrow.

Victoria's name will ever stand in the annals of the world pre-eminent among exalted women; and it will ever remain in our hearts and memories as an example of all that is good and noble, of all that is pure and without reproach.

NOTES ON THE GENITALIA OF HALISIDOTA HARRISII, WALSH.

BY HARRISON G. DYAR, WASHINGTON, D. C.

I see by Mr. Lyman's address (1899) before the Entomological Society of Ontario that he is a convert to the view of the specific distinctness of *Halisidota tessellaris* and *H. Harrisii*. I believe this to be correct.

When I last referred to the genitalic differences of these species, I expressed a possible doubt that the apparent differences might be found evanescent in a large material. Having just examined 74 preparations, I do not find this to be the case. In *tessellaris* the upper point of the side piece is free from the outer lobe and projecting (fig. 2);



in *Harrisii* this point is concealed behind the lobe and pressed close to (fig. 1). The differences are small, but readily perceptible. The preparations were made from two bred *tessellaris* and three bred *Harrisii*; afterward 69 captured examples were examined. These were a 1 of the specimens from Poughkeepsie, N. Y., recorded in Insect Life, and they proved to be 96% *tessellaris*. The total number captured should therefore be approximately 2,570 *tessellaris* and 106 *Harrisii*. *Harrisii* is evidently considerably the rarer species of the two.

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SOME PLANT-LICE AFFECTING PEAS, CLOVER, AND LETTUCE.*

BY E. DWIGHT SANDERSON.

Nectarophora pisi, Kalt., and varieties.

The "Green Dolphin" is one of the best-known pests of peas and vetches in Europe, though but little concerning its economy has been recorded by European writers. In this country, *N. pisi*, Kalt., has been noted by Thomas¹, Oestlund², and Williams³, but as their specimens were never compared with any from Europe, and as plant-lice are exceedingly variable and descriptions of them are, therefore, often of but little value even when accurate, the identity of their specimens with the European forms has been somewhat in doubt.

At the beginning of the present outbreak of the pest in the spring of 1899, as specimens of *N. pisi* of both American and European authors were unavailable for comparison, and as most of the European writers described the species as very much smaller than the remarkably large form under consideration, the species was named *Nectarophora destructor* by Prof. W. G. Johnson⁴, and described by him as new⁵. Prof. Johnson gives⁴ Mr. Th. Pergande as authority for the species, stating that he "considers it an undescribed species," and adds, "Inasmuch as Mr. Pergande does not care to describe it, it is my privilege to name the insect."

In Dec., 1899, the attention of the writer was called to a species of *Nectarophora* doing serious injury to lettuce under glass. Careful study failed to reveal but a few minor characteristics by which this species could be separated from *N. destructor*, Johns., the chief difference being its smaller size, but many specimens were as large as small *destructor*. The similarity of this aphid to *destructor* led to a study of the plant-lice infesting lettuce foliage, and also of the variation in size, form and colour of *N. destructor*, taken at different times during 1899 and 1900. The following table gives the average measurements of different series of specimens of *destructor*, those of *N. pisi*, Kalt., as given by various authors, and those of *N. destructor* as described by Prof. Johnson. Numbers 3, 4, 5, 11, 17, 20, 21 and 22 are all unquestionably *N. destructor*, Johns.:

(*From the Entomological Dept. of the Delaware College Agricultural Experiment Station, Newark, Del.)

1 Thomas, 8th Rept. St. Ent., Ill., p. 64 (1879).

2 Oestlund, Bull. No. 4, Geol. and Nat. Hist. Surv., Minn., p. 82 (1887).

3 Williams, Spec. Bull. No. 1, Univ. Nebr., Dept. Ent., pp. 6, 9, 18, 20, 23 (1891).

4 W. G. Johnson, Bull. No. 20, n. s., Div. Ent., U. S. Dept. Ag., pp. 94-9 (1899).

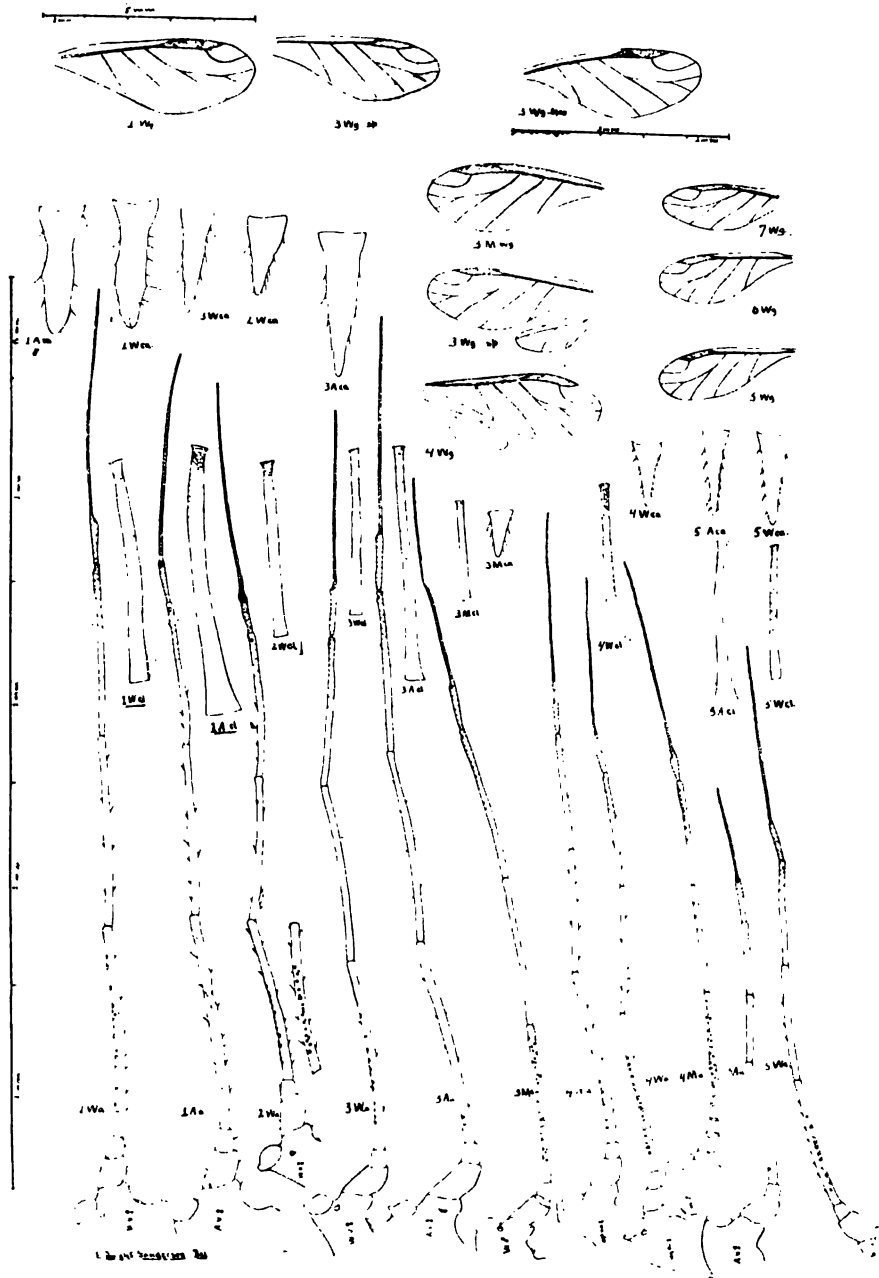
5 W. G. Johnson, CANADIAN ENTOMOLOGIST, XXXII., pp. 55-60 (Feb., 1900).

[illegible]

* Measured from figure--probably inaccurate. () Partly computed by writer.

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PLATE 2.



This study showed that the measurements given in the description of the species by Prof. Johnson represented specimens in May and June, when the species is at its maximum size, but specimens much smaller were found at that season, and those collected in October of 1899 and 1900 were uniformly smaller. It was found that the average size of specimens measured was as near that of *N. pisi*, Kalt., of Oestlund, as *N. destructor*, Johns., with no marked difference in colour. A careful review of European literature showed the size of *N. pisi*, Kalt., as given by different writers, to be quite variable; the length, for instance, as given by Koch (No. 7) is 3.3 mm., while Buckton (No. 9) gives 2.27 mm., and Taschenberg states that the winged female is slightly shorter than the wingless (No. 25), which he describes as 4 mm. long. The coloration as given by these writers is also variable.

In October, 1900, a form of the winged female (No. 11)—described below—was found migrating from peas to clover, which was much darker and smaller than the summer broods and in many respects more similar to some of the descriptions of *N. pisi*, and at the same time the apterous females and nymphs were distinctly pulverulent, which was not observed in June, but is mentioned in descriptions of *pisi*. A few winged males (No. 17)—described below—were also secured.

Having become well convinced of the identity of the two species, specimens of *N. pisi*, Kalt., were secured from Mr. G. B. Buckton, F.R.S., Haslemere, Eng., who kindly lent me two slides containing several specimens in Canada balsam. The specimens of one slide, collected at "Southgate, June 17, -47" (1847?) (Nos. 1 and 18), were of exactly the same size as *N. destructor* as described by Prof. Johnson, with exception of segment VI. of the antennæ being very much shorter. They also differed in having the cornicles and antennæ (Pl. I., 1a., 1cl.) considerably thicker than the smaller specimens of *destructor*, though very probably this is largely due to their having been flattened by the pressure of the cover glass and the drying of the balsam. The surface of the tips of the cornicles is reticulated, which has not been observed in typical *destructor*. None of these differences can, however, be considered as of sufficient value to separate the species, especially when one considers the variability of the species as given by European writers. The specimens of the other slide, marked by Mr. Buckton, "*Siphonophora pisi?*—Fool's Parsley," are considerably smaller, but are similar to the smaller forms of *destructor* found here, and lack the reticulation on the cornicles. There

is little question, therefore, but that the species (*N. destructor*, Johns.) so injurious during the past two seasons is the well-known "Green Dolphin" (*N. pisi*, Kalt.) of Europe⁶.

Past History.—In Europe the "Green Dolphin" has been known as one of the worst pests of peas and vetches for over a century. Kirby and Spence, writing in 1815, give an account of the damage done by this pest which corresponds very closely with our own experience, "those (aphids) which attack pulse spread so rapidly, and take such entire possession, that the crop is greatly injured, and sometimes destroyed by them. This was the case in 1810, when the produce was not much more than the seed sown; and many farmers turned swine into the pea fields, not thinking them worth harvesting. The damage in this instance was caused solely by the aphids, and was universal throughout the kingdom so that a supply for the navy could not be obtained. The earlier peas are sown, the better chance they stand of escaping, at least in part, the effects of this vegetable Phthiriasis." It is also remarked that the pest is worse in dry seasons.

The insect is evidently either native to America or has been established here for many years. The first record of its occurrence was in Minnesota in 1887 on Shepherd's Purse⁷. Since then it has been noted in Nebraska and Illinois on clover, beets, peas, and other plants.

Early in May, 1890, an experimental plot of crimson clover at this station was so badly attacked by what was undoubtedly this species of aphid that for a time it was feared the experiment would prove a failure.

One or two extensive growers of crimson clover inform me that they have seen this pest on crimson clover for at least six or seven years. As no other aphid is known to attack clover in any considerable numbers, there seems to be little doubt but that the same species has been present in Delaware for at least ten years. Mr. F. A. Serrine writes me that Long Island pea growers state that "they had a similar trouble with their

6 The full bibliography of the species appears in the Report of the Del. Coll. Ag. Exp. Sta. for 1900. *Aphis ulmarie*, Schrank, is undoubtedly the same species and several writers have preferred to use that name. Schrank's description, however, is not clearly recognizable, and I have preferred, therefore, to follow the majority of writers in using Kaltenbach's name. Exception might be taken to this usage, as very many aphids are not to be recognized from the original description of the species, but where types are not extant for purposes of comparison it would be much better were such descriptions discarded.

7 Thomas mentions it in Illinois in 1879, but it is doubtful whether his description applies to this species.

peas eight or ten years ago." In 1887 an aphid very similar to this species, and probably the same, was observed by Dr. L. O. Howard, U. S. Entomologist, on clover at Washington, D. C. Mr. R. H. Pettit, of the Mich. Agl. Experiment Station, informs me that one or two Michigan pea growers state that they have known a similiar plant-louse to infest peas for the past twenty years.

Fall Migratory Winged Viviparous Female.—Wing expanse, 9.3 mm. Length, 3.15 mm.; width, 1.05 mm.; Antennæ, 3.9 mm., III., 0.88 mm.; IV., 0.81 mm.; V., 0.72 mm.; VI., 0.28 mm.; VII., 0.97 mm. Tibia, I., 1.62 mm., II., 1.62 mm., III., 2.25 mm.; Cauda, 0.42 mm.; Cornicles, 0.70 mm. Average of 13 specimens.

Coloration same as male, except chitinous plates are slightly lighter, lateral spots and those above spiracles in abdomen are wanting, with two dark spots on subgenital plate, subventral plate green, lacking sensoria on V. antennal segment.

Apterous Viviparous Female.

Specimens late in October and in November are more or less covered with a distinct whitish pulverulence, are smaller, and darker green than in the summer.

Larvæ of these same broods have antennæ, cornicles and legs blackish or dark brown, body with more or less whitish pulverulence, which is especially marked and distinct on distal half of hind tibia; very different from larvæ in spring or summer.

Winged Male.—Wing expanse, 9 mm.; Length, 2.5 mm.; width, 0.95 mm.; Antennæ, 3.62 mm.; III., 0.77 mm.; IV., 0.71 mm.; V., 0.73 mm.; VI., 0.23 mm.; VII., 1.02 mm.; Tibia, I., 1.57 mm.; II., 1.50 mm.; III., 1.90 mm.; Cauda, 0.24 mm.; Cornicles, 0.50 mm. Average of 3 specimens.

Dorsal aspect head yellowish, ocelli black, eyes red, mesal line darker, a dark spot either side of meson caudally; ventral aspect head and thorax yellow, except mesosternum which is deep olive brown to blackish, shining, chitinous; rostrum reaches to centre of mesosternum, prothorax dorsally yellowish-green, thoracic dorsal plates dark-olivaceous to blackish; legs yellowish or reddish brown, tips of femora and tibia, and tarsi black; large blackish pleural spot on either side of mesothorax and two smaller spots caudad of it at bases of mesa and meta coxæ; abdomen light green, slightly whitish pulverulent, three or four lateral blackish spots cephalad of cornicles; cornicles green, tips black; cauda green;

irregular horizontal spots on either side of abdomen around pores of connexivum above spiracles.

VARIETIES.

Specimens of *Nectarophora*, on lettuce: collected at Lexington, Ky., in Feb., 1895 (Nos. 12, 26), kindly loaned me by Prof. H. Garman; on lettuce in Baltimore County, Md., Feb., 1899 (No. 14), by Prof. W. G. Johnson; and on clover at Ames, Iowa (Nos. 16, 28), by Mr. F. A. Sirrine; have all been carefully studied and measured. A similar form was also taken at Milford, Del., on peas, May 1, 1900.

The dimensions of series of these aphids, as given in the table, shade into each other and *N. destructor* and *pisi* so as to make it impossible to separate them satisfactorily on any distinctions of size. It should be remembered that the measurements of the table merely give the average size of each series and that individual specimens vary widely from them. Numbers 12, 13, 14, 15, 26 and 27 are of the same variety. They may be distinguished by segment III. of the antennæ of the apterous viviparous females bearing six to eight sensoria, about half of which are much larger than the remainder, while *N. pisi* has but one; the tips of the cornicles in both winged and wingless are reticulated as in No. 1. *N. pisi* from England, whereas in American forms of *N. pisi* (*N. destructor*) they are plain. A single winged male, seemingly of this species, was taken on lettuce at Newark, in Dec., 1899. It (No. 17a) is similar to the male of *pisi*, except that it is smaller and IV. has two sensoria, which are lacking in *pisi*, the sensoria on III. and V. being similar.

The winged (No. 16) and apterous (No. 28) viviparous females from Iowa lack the reticulation on the cornicles, and the sensoria are as in *N. pisi*, though they are so much smaller that they are probably a distinct variety. The apterous forms from Iowa (No. 28) are "stem mothers," having been hatched from winter eggs. They differ from the other apterous forms in the shorter antennæ and legs, and in VII. being shorter than III. It is not unusual, however, for the stem mother to differ from other broods. No distinctive characters could be found in the wing venation of any of these specimens.

For the present, therefore, from the material studied, we are obliged to consider all of these specimens as varieties of *N. pisi*, Kalt. A larger series and further observation of their life-histories may reveal specific distinctions. The present account is published merely to show the extreme

variability of this species (or, as it may prove to be, the likeness of several species), and the necessity of a careful study of it and allied species. The writer will be greatly indebted to any who may be able to aid him with material, preferably alive, for the prosecution of such a study.

Thomas's *S. pisi* (l. c.) does not seem to be the same as *N. destructor*, but is quite similar to the varieties described above.

N. erigeronensis, Thos., and *N. corydalis*, Oest., are very closely allied to *N. pisi*, but specimens of them have not come under our observation.* The types of neither seem to have been preserved.

(To be continued.)

*ADDENDA.—Since writing the above, Mr. O. W. Oestlund has kindly sent me specimens of these species. Concerning them he remarks:

"1. *N. erigeronensis* is well separated from *pisi* and *corydalis* by having the sensoria more numerous and scattered in several rows along the whole length of joint III., and by being raised above the surface or forming distinct protuberances. Front femur much shorter (0.70 mm.). Front wings shorter. Spur (VII.) of antenna equal to or not much longer than III.

"2. *N. pisi* is a much larger form. Sensoria less numerous (15-18) and nearly in a single row, and almost absent on apical $\frac{1}{2}$ of segment; not forming protuberances. Front femur much longer. Front wings larger. Spur much longer than III. (1.20; 0.90).

"3. *N. corydalis* comes very close to *pisi*, and possibly too close to stand, though in the general aspect of the insect it seems quite distinct. Size smaller. Sensoria fewer in number (12-15) and in a single row. Front femur, front wings, and spur much as in *pisi*."

The specimens sent me measured as follows:

Form.	Description.	Date.	No.	Wing Exp. se.	L.	W.	Antennæ.					Tibia.			Ca.	Cl.	
							I.	II.	IV.	V.	VI.	VII.	I.	II.			III.
W. V. Female	<i>N. pisi</i>	Oct. 28, '00	3	850	270	90		80					150		210	32	85
A. V. Female.	"	"	3		295	100		89	70				155	160	225	42	95
W. V. Female	<i>N. corydalis</i> . . .	Sep. 26, '85	4	800	208	85	290	65	57	60	15	88	130	130	190	34	64
W. V. Female	<i>N. erigeronensis</i>	June 27, '98	3	750	220	80	200	55	38	35	12	48	83	90	130	31	66
A. V. Female.	"	"	5		200		205	55	36	33	13	53	85	85	127	30	76

All were collected at Minneapolis, Minn.

This *N. pisi* is similar to Nos. 12, 13, etc. above, taken on lettuce, and shows the same differences between it and var. *destructor*. The specimens were collected on squash. The apterous viviparous female has 5 to 8 sensoria on III.

N. corydalis seems similar to No. 15 above. It does not differ materially from Oestlund's *pisi* (as he remarks), and I think it merely a variation, possibly a distinct variety.

N. erigeronensis is a quite distinct species. In the apterous viviparous female the cornicles are thicker, more finely reticulated at apex than in *pisi*, are blackish, reach beyond the cauda, curving outward; antennæ dark, 9 to 15 sensoria on proximal half of III. In the winged viviparous female the antennæ, tibiae, distal half of femora, apical $\frac{2}{3}$ of cornicles are blackish, cornicles reach to tip of cauda; sensoria numerous (20 or so) on III., and protuberant; capitate hairs scattering on antennæ and body.

E. D. S.

PRELIMINARY LIST OF THE MACRO-LEPIDOPTERA OF ALBERTA, N.-W. T.

BY F. H. WOLLEY DOD, CALGARY.

Calgary (altitude 3,400 ft.) is strictly a prairie city, situate at the junction of the Bow and Elbow rivers, about 40 or 50 miles from the true base of the Rocky Mountains. For several hundred miles to the east, the prairie is, with the exception of a few spots on river bottoms, absolutely void of either timber or scrub. A very few miles to the west the country becomes decidedly hilly, and in places densely covered with dwarf willows. Still further west the hills increase in height, shrubs become proportionately more abundant, and several species of poplars make their appearance, the north and west sides of the hills being usually densely wooded. By far the greater portion of the material from which this list has been compiled has been taken by myself and Mr. A. Hudson during the past seven seasons amongst these hills (3,600-4,000 ft.) near the head of Pine Creek, about sixteen miles to the south-west of Calgary. This "hill-prairie," as I will call it, and which may be looked upon as the boundary between the prairie and the foothills, is well watered by numerous creeks, and the valleys and hillsides—where not too steep—are largely grazed and cultivated, but otherwise splendid hunting grounds for the entomologist. Another favourite hunting ground, and one which has yielded many species not occurring nearer home, is about twelve miles further west, near Mr. Billings's lumber mill. Here the poplars have given place to spruce, fir, and pine; shrubless spots outside the timber are scarce, and swamps abound. Here, in short, commence the actual Rocky Mountain foothills. Had I had leisure to explore these foothills more thoroughly, I have no doubt my list would have been largely augmented. Two entomological trips have been made further into the hills to the south-west, to Mr. Lineham's lower log camp, on the south fork of Sheep Creek. On the first of these expeditions Mr. Hudson was successful in discovering several species of butterflies not seen elsewhere, but during the second, when I accompanied him, all the elements seemed combined against us.

From the end of October till nearly the end of April there is practically no outdoor work for the entomologist in this district. With the first few days of spring good work may be done after dark at swallow blossoms, provided the thermometer is a few degrees above freezing point. Almost before swallows have ceased to be attractive, *Erebia*

discoidalis and *Chionobas alberta* are out in swarms. Species continue to appear in gradually increasing numbers until July, which is perhaps the best all-round month. Treacle may be worked with success from about the middle of June, sometimes earlier, and in some years (notably in 1894 and 1896) is very prolific until the middle of September, and attractive to a few autumn species even in early October. On one or two nights during the above mentioned years moths positively swarmed on the treacled fence posts. About eighty moths on a single treacle patch at one time and fifty-five or sixty species in a night's treacling is about my record. They couldn't have been thicker on the treacle, simply because there wasn't room! That was during hot, dry seasons. The last two seasons (1899 and 1900) have been cold and wet, and absolute failures as regards treacling, and Lepidoptera on the whole have been extremely scarce. When I say that during the present year (1900) we had four of five inches of snow on the ground on June 8th, and again on August 25th, and add, moreover, that these storms were only a very few degrees colder than many of those that occurred frequently during the whole summer, it may well be imagined that captures were few and far between. However, at this altitude and proximity to the eastern slope of the Rockies, summer frosts are of frequent occurrence even in the hottest seasons, and the minimum nightly temperature is rarely above 40 degrees. For some reason or other, treacle put on green poplars is rarely, if ever, of any use. The trees must be dead and dry. I usually treacle fence posts, preferring those with the bark on. Attraction of moths by light has not on the whole been by any means a success, though it has produced several species that have not been captured by other means. In a warm, dry season—*i. e.*, when moths are thickest—the sky is usually too clear for light to have sufficient attraction, and in wet seasons, when the sky is more frequently overcast and the nights consequently darker, moths are scarce. Owing to the shortness of the season, very few species are double-brooded here, and most of those that are are only partially so, the second brood consisting of but a few stragglers.

The fauna of this district was practically unknown five or six years ago, and even now specialists not only differ "inter se," but are often undecided as to the identity of some of my species even after seeing long series. The fact of living so far from "headquarters," of course, adds largely to my difficulty in getting correct names. Many of my names, therefore, are, and are likely to remain for some time longer, doubtful;

but where such doubt exists, I have, in the following list, explained the circumstances as best I can, quoting the authorities who have seen my specimens, and, where my own opinion differs from theirs, stating grounds for my verdict. Breeding from the egg would doubtless clear up many doubts, as well as cause many surprises, but, unfortunately, I have never been able to spare the necessary time and attention for such useful experiments. It is also much to my regret that I have never been able to spend much time collecting after the middle of July. On this account I am very poorly represented in some obscure species, notably in the genus *Argynnis*. This is the more unfortunate by reason of some of the representatives of that genus here in the West being very difficult to place. My thanks are due to Prof. J. B. Smith, who has done all in his power to assist me in naming my Noctuidæ; also to Messrs. Elwes, W. H. Edwards, Drs. Ottolengui, Fletcher, Skinner, Holland, and others who have from time to time named specimens for me. Mr. Bean worked the Laggan district for several years, in the mountains near the western boundary of Alberta, and a few of my records are on his authority. Mr. Sanson, of Banff Museum, and Mr. P. B. Gregson, of Lacombe, about a hundred miles north of Calgary, have also kindly assisted with supplementary lists.

(To be continued.)

ON SOME DIPTERA BRED FROM COW-MANURE.

BY L. O. HOWARD, WASHINGTON, D. C.

In the summer of 1889, while engaged in an investigation of the habits and life-history of the horn fly of cattle (*Haematobia serrata*), the writer at various times brought to Washington from different points in Virginia, large quantities of cow-manure collected in the field, and eventually succeeded in working out the complete life-history of the horn fly, as displayed in *Insect Life*, Vol. II., No. 4, October, 1889. In this article the statement is made, in concluding, that the observations were greatly hindered and rendered difficult by the fact that fresh cow-dung is the nidus for a number of species of Diptera, some about the same size and general appearance as the horn fly, and that no less than twenty distinct species of flies had been reared from horse- and cow-dung, mainly the latter, and six species of parasitic insects as well. The plan finally adopted of securing the isolation of the horn flies was to remove the eggs

from the surface of the dung and place them with dung which was absolutely fresh and collected practically as it fell from the cow. A report upon the other species was promised, but was never published, although Professor Riley, in his report for 1890, listed eight parasites, only two of which were specifically determined.

The writer's recent investigations of the insect fauna of human excrement (Proc. Wash. Acad. of Sciences, Vol. II., pp. 541-604—Dec. 28, 1900) aroused his interest in the general subject of coprophagous insects, and the flies reared in 1889-90, from cow-dung, were looked up and have been named by Mr. D. W. Coquillett. The list is so interesting that it should be recorded. It will be noticed that several of the species are identical with those found breeding in human excrement. These are: *Sarcophaga incerta*, *Helicobia quadrisetosa*, *Musca domestica*, *Morellia micans*, *Myospila mediatubunda*, *Ophyra leucostoma*, *Sepsis violacea*, *Sphaerocera subsultans* and *Limosina albipennis*. The rearing of *Ceratopogon specularis* from cow-dung is of especial interest, since, down to the record in the Washington Academy paper just referred to, no insects of this genus had been found to be coprophagous. Some of the other records are interesting for the same reason. The list follows:

Family CECIDOMYIDÆ.

Diplosis, sp. Issued Dec. 26, 1889; and Jan. 18, 1890; 4 specimens.

Family MYCETOPHILIDÆ.

Sciara, sp. Issued March 26 and 29, 1890; 2 specimens.

Family CHIRONOMIDÆ.

Camptocladius byssinus, Schrank. Issued Jan. 2, 1890. Issued Dec. 31, 1889; and March 25, 1890; 9 specimens.

Camptocladius minimus, Meigen. Issued Dec. 23, 26, 27, 30 and 31, 1889; and Jan. 13, 18, and March 25, 1890; 12 specimens.

Ceratopogon specularis, Coq. Issued August 28, 1889. Issued Dec. 30, 1889; 6 specimens.

Psychoda minuta, Banks. Issued Dec. 26, 30 and 31, 1889; and Jan. 11, 1890; 4 specimens.

Family RHYPHIDÆ.

Rhyphus punctatus, Fabr. Issued Sept. 2, 3 and 4, 1889. Issued Jan. 13, 16, 18, 20, 22, 24 and 29, Feb. 1, March 26 and 29, and April 5 and 9, 1890; 64 specimens.

Family SARCOPHAGIDÆ.

Sarcophaga incerta, Walker. Issued Aug. 31, 1889. Issued Aug. 30, 1889; 7 specimens.

Sarcophaga, sp. Issued April 23, 1890; 1 specimen.

Helicobia quadrisetosa, Coq. Issued Aug. 6 and 30, 1889; 2 specimens.

Pollenia rudis, Fabr. Issued Dec. 23, 1889; 1 specimen.

Family MUSCIDÆ.

Musca domestica, Linne. Issued Aug. 30 and Sept. 2 and 4, 1889; 20 specimens.

Morellia micans, Macq. Issued Aug. 30, 1899. Issued Dec. 23, 26, 27, 28, 30 and 31, 1889; Jan. 2, 6, 8, 9, 10, 11, 13, 14, 16, 17, 18, 20, 25 and 27, Feb. 1, March 25, April 5 and 9, 1890; 125 specimens.

Myospila mediatubunda, Fabr. Issued Aug. 26, 28, 29, 30, Dec. 23, 1889; Jan. 9, March 25, 26, April 2, 9, 14, 15, 1890. Issued April 5, 1890; 48 specimens.

Hamatobia serrata, Desv. Sept. 17; 2 specimens.

Family ANTHOMYIDÆ.

Hydrotæa armipes, Fallen. Issued Sept. 27, 30, Oct. 4, 1889; Jan. 2, 6, 7, 8, 9, 10, April 24, 1890; 38 specimens.

Hyetodesia umbratica, Meigen. Issued Feb. 13, 21, April 2, 9, 14, 15, 1890.

Ophyra leucostoma, Wied. Issued Sept. 6, 1889; 11 specimens.

Limnophora, sp. Issued Aug. 30, 31, 1889; 5 specimens.

Cænoscia lata, Walker. Issued April 25, 1890; 1 specimen.

Cænoscia flavicoxæ, Stein. Issued Aug. 31, 1889; 4 specimens.

Phorbia, sp. Issued March 29, 1890; 1 specimen.

Family SEPSIDÆ.

Sepsis violacea, Meigen. Issued Aug. 28, 1889; 8 specimens.

Family BORBORIDÆ.

Sphærocera subsultans, Fabr. Issued Aug. 30, 1889; 7 specimens.

Limosina albipennis, Rondani. Issued August 28, Dec. 23, 1889; 2 specimens.

ACKNOWLEDGMENT.

I desire to publicly express the deep indebtedness of the Entomological Society of Ontario to O. C. Poling, Esq., of Quincy, Ill., for his generous gift to its exotic collection, of a box of mounted butterflies in prime condition, numbering 50 specimens of 30 named species and varieties, many of them being exquisitely beautiful forms.

J. ALSTON MOFFAT, Curator.

NEW JASSIDÆ FROM THE ROCKY MOUNTAIN AND
PACIFIC REGION.

BY E. D. BALL, FORT COLLINS, COLO.

(Continued from page 11.)

EUTETTIX MILDREDÆ, n. sp.

Form and general appearance of *pulchella*; colour pattern of *scaber*, but with extra markings, and different colours on pronotum and elytra. Length, 5.5 mm.; width, 1.75 mm.

Vertex slightly angularly rounded, transversely depressed before the apex; front as in *scaber*, the margin between front and vertex more strongly produced. Pronotum slightly angularly rounding anteriorly, much more so than in *scaber*; lateral angles scarcely apparent, rounding from eye; pronotum and scutellum convex, elevated.

Colour: vertex orange yellow, paler at base; scutellum orange, the basal angles and the margins at apex irrorate with fuscous. Pronotum dirty white, some black spots next the eyes; disc irrorate, pale olive brown, omitting an oval spot on the posterior disc on either side and the median line. Elytra milk white, with black margined areas of olive brown, as follows: All of clavus except a semicircular spot at base and another at middle of claval suture; an oblique band on corium, beyond this spot narrowing to the costa. There are three pairs of black spots along the sutural margin of clavus, the apical pair largest. The claval suture between the white spots, and the anterior and costal margins of the oblique band, heavily black. Inner apical cells and a few spots on costa irrorate with black. Face orange, a black spot on outer angle of either lora. Below pale yellow and fuscous.

Genitalia: ultimate ventral segment of the female about twice the length of the penultimate, the posterior margin broadly, slightly rounding, the median third produced in two rounding lobes; the notch between them not as deep as their length, the lobes usually black; male valve obtusely triangular, a little over half the length of the ultimate segment; plates long triangular, about three times the length of the valve, the apex attenuate, filamentous, together with the margin clothed with long silky hairs.

Described from three females from Colorado Springs, taken by the author, and fourteen examples of both sexes from Manitou, collected by Prof. Van Duzee. This is one of the prettiest Jassids that I have ever seen, and I take pleasure in naming it after my wife, whose careful drawings will add much to the value of my future synoptic work.

EUTETTIX PERELEGANTIS, n. sp.

Form and colour pattern of *Mildreda*, slightly smaller and darker. Length, 5 mm.; width, 1.5 mm.

Vertex slightly more angular than in *Mildreda*, distinctly longer on middle than against eye, transversely depressed; front narrower than in *Mildreda*, not rounding in to the clypeus. Pronotum not as convex, the posterior margin scarcely emarginate.

Colour: vertex pale creamy, six equidistant, pale fulvous spots on margin, basal half sparsely irrorated with pale fulvous. Pronotum dirty white, heavily marked with black behind the eyes; a broad parallel margined stripe on either side the median line, olive brown. Scutellum brownish fuscous, irrorate with pale, a small spot at apex, a pair of larger quadrangular ones on lateral margins back of the suture, and a minute one at each basal angle, milk white. Elytra, colour and pattern as in *Mildreda*. Face dirty white spots on loræ as in the former species. Below fuscous and pale.

Genitalia: ultimate ventral segment of the female over twice the length of the penultimate, the posterior margin broadly rounding, the median fourth roundly emarginate one-fourth the depth, with a stout median tooth often bidentate at the apex; male valve obtusely triangular, the apex roundly truncate, trilobate; plates three times the length of the valve, long triangular, the apex acute, filamentous, margins with silky hairs.

Described from five females and one male from Salida, Ridgway and Durango, Colo. Readily separated from *Mildreda* by the colour pattern of the vertex, pronotum and scutellum, and the distinct female segment.

EUTETTIX SAUCIA, n. sp.

Form and general appearance of *scaber*, smaller and paler, the vertex mostly pale. Length, 4.5 mm.; width, 1.5 mm.

Vertex longer, narrower and more angulated than in *scaber*; face narrower above, longer than its basal width, rounding to the clypeus. The pronotum broadly and evenly rounding in front, truncate behind, almost twice the length of the vertex.

Colour: vertex pale yellow, six minute points on anterior margin and three irregular irrorate patches on posterior margin brownish fuscous. Pronotum white, coarsely irrorate with dull brown except a narrow lateral margin and traces of three pale lines. Scutellum more finely irrorate, three ivory white points in a triangle beyond the transverse line. Elytra

milky white, closely and finely irrorate with dull brown, as follows: All of clavus except a narrow strip along basal two-thirds of claval suture, once or twice interrupted and broadened at the end; a rather narrow oblique strip across corium beyond this and some irregular markings towards the apex, which form two definite spots on the costa. Two pairs of pale spots along the sutural margin of clavus. Face pale yellow, below pale and fuscous.

Genitalia: ultimate ventral segment of the female nearly twice longer than penultimate, the posterior margin nearly truncate from the rounding angles, with two triangular, slightly protruding, median teeth; male valve very obtusely triangular; plates long triangular, their apices attenuate, black, clothed with fine silky hair.

Described from a pair from Denver, a male from Fort Collins, Colo., and another from Tucson, Ariz. This species is closely allied to *scaber*, from which the longer vertex, smaller form, lighter colour and absence of distinct band on vertex will easily distinguish it.

EUTETTIX SCITULA, n. sp.

Resembling *seminuda*, but with the pronotum darkened up. Length, 5.5 mm.; width, 1.5 mm.

Vertex almost parallel margined, twice wider than long, half the length of the pronotum, strongly depressed. Front rather flat, its length and breadth about equal. Pronotum long, its lateral angles distinct, disc but feebly convex.

Colour: vertex pale creamy yellow, six pale fulvous spots along the anterior margin, sometimes a pair of spots near eyes on basal half. Pronotum dull white, coarsely irrorate with dark fulvous, omitting the pale yellow anterior margin. Traces of three pale stripes. Scutellum pale, the fine dark brown irrorations usually heaviest in a spot just within the basal angles on either side, and another behind the transverse suture. Three spots in a triangle on apical half ivory white; posterior disc light. Elytra milky white, a few coarse brown irrorations along the humeral and sutural margins before the middle, a transverse band behind the middle as in *seminuda*, but darker brown, and some irregular infuscations towards apex. Face and below pale yellow, pale fuscous arcs on front.

Genitalia: ultimate ventral segment of female twice the length of penultimate, the posterior margin slightly rounding, with two small roundly angular, median teeth; male valve obtusely triangular; plates long triangular, their apices attenuate, infusate.

Described from numerous specimens from Fort Collins, Pueblo, Salida and Grand Junction, Colo. This species is most closely related to *seminuda*, but the genitalia and pronotal band will at once distinguish it.

EUTETTIX PULLATA, n. sp.

Form and general appearance of *scitula*, but darker, approaching *perelegantis* in shade, but lacking the definite pattern of that species. Length, 5.5 mm.; width, 1.5 mm.

Vertex two and one-half times wider than long, half the length of the pronotum, transverse depression very shallow, front broad and flat. Pronotum rather flat, scutellum transversely depressed, the apex swollen, elevated.

Colour: vertex white or pale yellow, a narrow fuscous line just in front of eyes, in front of which are four dots, and behind which are three large irregular, sometimes confluent, irrorate patches. Pronotum light, coarsely and somewhat sparsely irrorate with brown. Scutellum with a brownish fuscous patch just within each corner, disc pale or orange yellow. Elytral pattern as in *scitula*, but broader and darker; clavus entirely reticulated except for two transverse bands, one at base and a broader, interrupted one before the middle, the white area of the corium with a few dots or reticulations.

Genitalia: ultimate ventral segment of female three times the length of the penultimate, the posterior margin broadly rounding, the median fourth triangularly excavated, the apex of this excavation broad, rounding or bidentate; male genitalia as in *scitula*, valve obtuse, plates long triangular, the margins straight, tips attenuate.

Described from eighteen specimens from Manitou (Van Duzee), and five from Colorado Springs and Salida, Colo., by the author.

EUTETTIX MUNDA, n. sp.

Form of *jucunda*, Uhler, longer and redder. Resembling *costamaculata*, Van D., but with the costa reticulate. Length, ♀ 6 mm., ♂ 5 mm.; width, 1.75 mm.

Vertex sloping, transversely depressed, parallel margined, three times wider than long, two-fifths the pronotal length; front longer than its basal width, the margins evenly narrowing to the clypeus. Elytra broad, much longer than the body, the apices flaring; venation distinct, the second cross nervure present, joining the fork of the inner branch of the first sector in nearly a straight line, the inner continuation of this fork leaving this line at about the middle.

Colour: vertex fulvous, a pair of approximate spots on tip, and sometimes a spot on either side of disc at base, fuscous. Pronotum pale olive, somewhat washed with fulvous, the posterior disc omitting the margins irrorate with testaceous. Scutellum pale, the apex and a point on each lateral margin ivory white, a pair of spots between these, black, a large spot just inside either basal angle and a pair of dots on disc testaceous. Elytra milky white, reticulated with coarse pigment lines between the sectors, and washed with brown; a definite light band at base, widest on the costa, and a narrower, less definite one across the second cross nervure, a heavy fuscous spot before the middle of the sutural margin, a smaller one behind, shut off by a white crescent, and a third at apex of clavus. Apical cells somewhat infusate. Face fulvous, below pale fulvous.

Genitalia: ultimate ventral segment of the female over twice the length of the penultimate, the lateral margins narrowing to the slightly produced lateral angles, posterior margin between these angles truncate with a slightly produced, rounding, median lobe. Male valve obtusely angular, the apex produced, plates broad, slightly concavely narrowing to an acute point, four times the length of the valve, the apex curving up.

Described from seven females from Palmer Lake, Salida, Ridgway, Dolores and Durango, Colo., and one from White Mts., N. Mex., from Prof. Cockerell.

EUTETIX MANITOU, n. sp.

Form and general appearance of *modesta*. Smaller and more distinctly golden yellow, especially in the male. Length, ♀ 4.5 mm., ♂ 3.75 mm.; width, ♀ 1.5 mm., ♂ 1 mm.

Vertex a trifle over half as long as its basal width, evenly rounding or very slightly angulate, disc slightly depressed, passage to front more rounding than in the preceding species. Pronotum more rounding anteriorly than usual in this genus. Elytra very flaring in the female, scarcely so in male, venation as in *oculea*, claval nerves tied together and to the suture before the middle, central anteapical cell constricted, usually divided.

Colour: female, vertex pale yellow, a pair of approximate spots at apex fuscous. Pronotum pale olive washed with golden, omitting about three pale stripes. Elytra milky, nervures brown, becoming fuscous before apex and on costa, disc with a testaceous brown cloud which is interrupted by a narrow, parallel margined, transverse light band just before the black-tipped clavus and another irregular band before the

apical cells. A few light spots at base of clavus and along the suture. Male, vertex lemon yellow, pronotum, scutellum, all the clavus and the adjoining part of corium bright golden yellow. Apical and costal margins of elytra yellowish subhyaline, the apical veins and the apex of clavus fuscous, some milky spots around the second cross nervure.

Genitalia : ultimate ventral segment of female three times the length of the penultimate, the posterior margin very slightly rounding with a broad, median production which is rounding or slightly bilobed ; male valve very broad, obtusely rounding, the apex produced, plates four times the length of the valve, concavely narrowing, the margins and apex upturned.

Described from four females and two males from Manitou and one male from Dolores, Colo. The two Manitou males were taken by Prof. Van Duzee. The females of this species are quite similar to *modesta*, but the male is much smaller and of a bright golden yellow. The genitalia are quite distinctive.

EUTETTIX OCULEA, n. sp.

Similar to *jucunda* in form, slightly broader and shorter, vertex fulvous. Eyes bright red. Elytra lacking the brownish cast of *munda*. Length, ♀ 4.75 mm., ♂ 4.25 mm.

Vertex not quite half as long as its basal width, two-thirds the length of the pronotum ; the front longer than its basal width, clypeus broadly expanded at apex. Elytra rather broad and flaring, much longer than body, venation as in *munda*.

Colour : vertex fulvous, a pair of spots on the apex, a line in the depression and a spot on either side of the disc testaceous. Pronotum milky, the anterior margin washed with fulvous, anterior half of disc irrorate with fuscous. Scutellum pale fulvous, the basal angles and a pair of spots on the disc testaceous, the transverse line black. Elytra milky, the nervures and transverse pigment lines along claval suture, the costal margin and a spot in the central anteapical cell fuscous. A few fuscous spots along the sutural margin and on the apical veins. Face fulvous, front washed with testaceous, femora dark. Eyes bright red.

Genitalia : ultimate ventral segment of female three times the length of the preceding, lateral margins narrowing, posterior margin slightly angularly produced from just within the lateral angles, the apex roundly bilobed ; male valve very broad and short, posterior margin nearly truncate, with a median tooth, plates broad, concavely narrowing, their apices attenuate, the inner margins of which are concave.

Described from fourteen specimens from Rifle, Ridgway and Dolores, Colo. This and the two preceding species belong to a small group which includes *jucunda*, Uhler; *costamaculata*, Van D., and *modesta*, O. & B. They possess the second cross nervure, and have been referred to *Allygus* by some authors.

ATHYSANUS LITIGIOSUS, n. sp.

Broad and short, vertex almost parallel margined. Colour pale, with three transverse bands on vertex and dense irrorations on pronotum and elytra fuscous. Length, 5 mm.; width, nearly 2 mm.

Vertex broad and short, scarcely extending in front of the eyes, two and one-half times wider than long, scarcely longer on middle than against eye. Front very broad above, narrow below, scarcely longer than wide, disc feebly convex. Pronotum broadest behind, where it equals or slightly exceeds the width of the eyes, nearly three times the length of the vertex. Elytra broad, venation strong, resembling *extrusus*, the central anteapical cell rather long, enlarged at the apex.

Colour: anterior half of vertex black, almost divided into two transverse bands by a light line which is parallel with the yellow line separating the vertex and front, posterior half of vertex orange yellow, divided by an interrupted transverse fuscous band. Pronotum ivory white, heavily irrorate and vermiculate with fuscous, a few definite spots behind the eyes. Scutellum dark testaceous, the margins and a pair of irregular longitudinal lines white. Elytra ivory white, the nervures and many irregular reticulations fuscous, a band on tip and another across the apex of the clavus, a spot on the costa between the bands and another in the inner discoid cell fuscous. Between these bands subhyaline, especially along the margin. Face all black except a light line just below and parallel with the basal line. Legs black, the spines and an annulus on the posterior tarsus orange.

Genitalia: male valve broad and obtuse, angular, plates broad at base, about twice the length of the ultimate segment, roundly narrowing to the acute apices, from which extend a pair of short divergent filaments.

Described from a single male received from Mexico (O. W. B.); probably from Cuernavaca. It is very distinct from any described form, and is not a typical *Athysanus*. The head and markings suggest *Scaphoideus*, but the form is too broad. The elytra are very much like some *Phlepsius* forms.

NEPTICULA POMIVORELLA, PACKARD; ALIAS MICRO-
PTERYX POMIVORELLA, PACKARD.

BY AUGUST BUSCK, WASHINGTON, D. C.

During a visit to Professor Fernald, in Amherst, Mass., last spring, he showed me a *Nepticula*, bred from Apple, which he had described in manuscript as a new species, but which he afterwards had suspected to be *Micropteryx pomivorella*, Packard.

From reading the description and life-history of Packard's species, I felt sure that it was a *Nepticula* and presumably the same as Professor Fernald's species, and a week after, while studying the collection in the Agassiz Museum, Cambridge, I obtained definite proof that we were right.

There I found Packard's type—imago and cocoon—in rather poor condition, but easily recognizable as a typical *Nepticula* and similar to a large series of fine bred specimens in the U. S. National Museum.

The habit of this species of forming its cocoon on the twigs or the branches instead of descending to the ground, as is rather more common in the genus, makes the cocoon liable to be confounded with that of *Coptodisca* (*Aspidisca*) *splendoriferella*, Clemens, which is also frequently found in numbers on Apple.

Both have been mistaken for scale insects.

By a common hand-lens, however, they can be easily separated, as the *Nepticula* cocoon is made of matted silk, while the *Coptodisca* cocoon consists of two small, oval, pieces of the epidermis of the leaf cut out and spun together at the edges and fastened to the twig by small short silk bands.

The mines of the two insects are also easily distinguished, that of the *Nepticula* being a long narrow serpentine track only slightly widened as the larva grows, and, if empty, with a semicircular slit at the end in the upper epidermis, through which the larva has escaped; while the *Coptodisca* mine, which also begins as a narrow track, soon broadens out into a several times wider, more or less circular blotch, and when empty shows the oval hole in the leaf, where the larva has cut out the upper and lower epidermis for its case.

To distinguish between the shining dark *Nepticula* imago with its tufted reddish-yellow head and the large eye-caps and that of the equally shining light-coloured smooth-headed *Coptodisca* does not of course present any difficulties.

The following are some of the more important references only to :

Nepticula pomivorella, Packard ; *Micropteryx pomivorella*, Packard, 17th Ann. Rep. Bd. Agr., pp. 237-8, 1870 ; Amer. Naturalist, Vol. IV., p. 685, 1871 ; Hayden, Bull. Geo. Survey, Vol. IV., p. 157, 1878 ; J. B. Smith, List of Lep. No. 6020, 1891 ; Bull. No. 26 (new series), Dept. of Agr., p. 94, 1900.

DESCRIPTIONS OF SOME NEW SPECIES OF NORTH AMERICAN LEPIDOPTERA.

BY WILLIAM BARNES, M. D., DECATUR, ILL.

<i>Euhalisidota Otho</i> , n. sp.	<i>Dasylophia Melanopa</i> , n. sp.
<i>Edema Suavis</i> , n. sp.	<i>Euthyatira Superba</i> , n. sp.
<i>Dasylophia Saturata</i> , n. sp.	<i>Feralia Brillians</i> , n. sp.

Euhalisidota Otho, n. sp.

♂, expanse $2\frac{3}{8}$ in.; ♀, $2\frac{1}{2}$ in. Fore wings long, pointed, apices depressed, of a uniform pale, rather dirty yellowish colour. There is a row of short intravenular dashes which form a narrow blackish line from apex to inner margin close to thorax. In the females this is almost straight, in the males it has somewhat of a downward curve. Another row of somewhat sagittal-shaped spots forms a second dark band from apex to inner margin a little within inner angle. Hind wings yellowish, semitranslucent, inner third dusky. Discal dot small, black. These markings, while distinct, are not heavy or pronounced. Thorax a little darker than wings. Abdomen dusky above, anal tuft yellowish. Beneath as above, only fainter. Thorax, legs and abdomen same, except inner side of fore femora, which are somewhat orange. Palpi dusky at extreme tip. Antennæ dusky, narrowly bipectinate in ♂, broadly so in ♀. The ♂ has the dusky shades darker than in the ♀, the abdomen being quite dark blackish brown above, contrasting with the light anal tuft. Types 2 pair in my collection from Huachuca Mt., Arizona. I take pleasure in naming this species after Mr. Otho C. Poling, of Quincy, Ill., as a slight token of my appreciation of the many favours he has done me.

Edema Suavis, n. sp.

Western examples of *Albifrons* differ from the eastern in having the dark shade below the costal white patch considerably darker. The discal mark is short, thick and black. The collar is very dark grayish black, the thoracic patch being only a little if any lighter. Hind wings of male white, slightly dusky at base of fringes. In the female the hind wings are dusky, about same as in *Albicosta*. The pectinations of the ♂ antennæ are considerably longer than in *Albicosta*, which character seems to me to entitle the insect to specific rank, otherwise I should consider it a mere variety of *Albifrons*. Types 4 ♂ and 1 ♀ in my collection from Glenwood Springs and Durango, Colo.

Dasylophia Saturata, n. sp.

Pale yellowish or buff colour, most of the veins rendered prominent

by light brown edging on both sides. Inferior margin slightly grayish. No black basal dash as in *Anguina* and *Melanopa*. Spots at internal angle prominent. The dark shade following t. p. line about same as in *Anguina*, but somewhat more prominent from the contrasting lighter shade. Hind wings yellowish white, veins slightly dusky. Type 1 ♂ in my collection from Denver, Colorado. This is probably the Western form of *Anguina*, but it must be quite rare, as it is the only one I have ever received. The typical form I have from Texas, Illinois, Iowa, and Manitoba, as well as the Eastern States. The uniform buff colour, pale secondaries, and lack of the basal dash, present an appearance quite different from the commoner Eastern form.

Dasylophia Melanopa, n. sp.

Considerably larger than *Anguina*, the ♂ being 1 and 11-16 inch in expanse and the ♀ 1 and 15-16. Palpi externally flesh-coloured, bordered above and below with dark brown. Vestiture of head and collar ochraceous, of a darker shade between the antennæ. Patagiæ dark gray with a narrow central black line. Thorax ochraceous centrally in front, else dark gray with traces of narrow black longitudinal lines. Abdomen evenly coloured, dark fuscous. Lighter beneath. Legs rather heavily coated with rich brown hair externally, lighter internally. Fore wings have a subquadrate basal flesh-coloured patch, the margin of which begins at base of costa, extends in an even gradual curve to where the t. a. line crosses median vein; from this point it follows the t. a. line downward a short distance and then returns to base of wing. The median vein through this space is of a somewhat darker brown. The basal space above this patch is of a rich dark brown colour, sharply limited externally by the t. a. line. The remainder of the basal space, the lower third of the terminal and the whole of the median space is of a dark gray colour, rather thickly speckled with black. The costal edge of the median space is lightly washed with reddish. A very dark brownish shade covers that portion of the wing from the t. p. line to apex, darkest along costa, gradually merging into a paler yellowish brown patch below and to the outer side. This dark subapical patch extends along the t. p. line to the median vein, and seems to be a continuation of the dark basal patch, the gray median space cutting sharply through the middle of it. Four or five minute yellowish points on costa between apex and t. p. line at regular intervals. There are two black spots inside the terminal line in the submedian space and two opposite these, external to it. T. a. line

double, distinct, filled with gray, quite evenly scalloped. T. p. line distinct, especially above median vein, light filled. Subterminal line brown, deeply toothed above median vein, more even in the next two spaces and reduced to two small round spots in two following. The spaces between the teeth down to the median vein are filled with bluish gray externally and yellowish brown internally, the veins being narrowly lined with brown. Three or four dark dashes precede the lighter space. A fine dotted line at base of fringes, which are yellowish gray, darker at ends of veins. Secondaries blackish fuscous externally, gradually lightening somewhat internally, fringes paler. Beneath fore wings blackish, costa with two or three dark spots and about an equal number of light ones. Veins at outer margin prominently margined with buff-coloured scales. Hind wings somewhat lighter than above, veins as on fore wings. The ♂ differs in having the colouring much less pronounced, the basal space being largely encroached upon and obscured with blackish, the median vein being black. Hind wings lighter above and both wings very much lighter below. Types 1 pair in my collection from Huachuca Mts., Arizona.

Euthyatira Superba, n. sp.

♂ expanse $1\frac{5}{8}$ inches. Head and thorax light brown with a purplish tinge, the latter marbled with lighter purplish shades. Abdomen yellowish fuscous, tufted. Palpi yellowish, externally darker, terminal joint dark fuscous. Tongue yellow. Fore wings brownish, costa somewhat shaded with black, ordinary markings indistinct. T. p. line double, lunulate, obscured at costal end by the dark shade. T. a. line black, indefinite. Reniform ovate, erect, brown centred, lighter ringed, not prominent. Orbicular a small scarcely discernible yellowish spot. Veins lightly shaded with black a short distance on either side of t. p. line. Fringes yellow with a darker yellow basal line. Terminal line dark, lunulate, cutting fringes along veins. The lunules are filled with ground colour in centre of wing, becoming more yellowish towards apex and internal angle. Pinkish white scales line the excavations of the terminal line, lightly towards apex, scarcely discernible at middle of wing and prominently so towards inner angle. There are five large, prominent, sharply-defined light-coloured spots on the wing. These are more or less completely ringed with white and filled with shades of pink and yellowish brown. The basal one is largest, extending completely across wing and outwardly to t. a. line, the course of which it follows.

The upper portion is filled with shades of pink and white, the lower by a double yellowish blotch. At the middle of the inner margin is a subquadrangular brownish spot, bordered above and to outer side with white. The spot at inner angle is oval, the lower edge cut squarely off by inner margin. Apical spot ovate, pink-filled, little or no trace of brown, white bordered along inner edge and inner portion of lower. The fifth spot is on costal edge, just within the apical, with which it is connected by a narrow white dash running from the middle of the costal to lower edge of apical, it is round, filled with yellowish brown and entirely bordered with pinkish white. There are one or two minute white points on costa between the two spots. Hind wings dark fuscous, fringe lighter, a faint narrow, lighter median band. Beneath wings yellowish white, spots of upper surface faintly discernible. Legs quite thickly coated with hair of a light purplish-yellow colour. Type 1 ♀ in my collection from Huachuca Mts., Arizona. Kindly presented to me by my friend, Mr. Poling.

Feralia Brillians, n. sp.

Ground colour a brilliant grass green, ordinary lines black, shaded with white. Front vertex and collar green, varying in shade in different specimens, but in all lighter than thorax. Patagiæ and thorax dark green, the former fringed with whitish, as is also the thorax posteriorly. There is a fine black line at base of collar and some black hairs scattered along the patagiæ next to the white margin. At base of thorax there are also black hairs, which are apparently clustered into two or three tufts, but this may have been caused by the pins. Abdomen bronze brown, the anterior edge of segments fringed with green. Beneath whitish, except at tip, which is black. Thorax beneath pale greenish white, as are also the legs, except the tarsi, which are ringed with black and yellowish white. Antennæ fuscous above, yellow beneath. Palpi blackish externally, yellowish internally. Tongue yellow. Fore wings darker and lighter shades of the same tint of green, beautifully variegated by the bright black lines and white shades. Basal half line black, distinct, narrowly shaded with white externally. T. a. and t. p. lines strongly convergent at inner margin and connected by a short black dash just before reaching it. T. a. line black, heavy, general direction strongly outwardly oblique, irregularly scalloped. In one specimen it is more or less broken. Prominently shaded with white internally. T. p. line regularly scalloped, curved widely around cell, then nearly in a direct line to inner margin very

close to t. a. line, rather narrowly shaded with white externally. S. t. line black scalloped, inclined to be fragmentary, especially heavy at costa and just before reaching inner margin. Costa inclined to be lighter than ground colour, especially outer half, dotted with black. Orbicular large, round, bordered by a fine black line, within which is a narrow white shade, centre filled with green. Reniform large, upright, constricted, black ringed, a white ring lining the black encroaches largely on the green filling, dividing it into an upper and a lower patch. Fringes whitish, checkered with bronze between the veins. At the inner angle the check extends through the terminal space to the s. t. line, forming a conspicuous quadrangular bronze patch. Hind wings white, tinged with pale green outwardly, a few dark scales at inner angle. Fringes checkered white and pale green. Beneath pale greenish, lower portions of both wings lighter, markings of upper surface traceable. There is a rather prominent patch of dark scales on costa at inception of s. t. line, and in some specimens indications of one or two other costal patches. Types 2 pair in my collection. Huachuca Mts., Arizona.

TABLE TO SEPARATE THE GENERA AND SUBGENERA OF COCCIDÆ RELATED TO LECANIUM.*

BY T. D. A. COCKERELL AND P. J. PARROTT.

The following table of the forms related to *Lecanium* must be regarded as provisional, pending a thorough study of the different stages of the now very numerous described species. Certain species will be found not to fit into the table at all, but we defer the proposal of new generic names for them, pending further studies :

1. Female flat or slightly convex, legs and antennæ slender, normal... 5.
2. Female convex, usually hemispherical, hard when mature; legs and antennæ slender, normal..... 6.
3. Female more or less spherical, closely resembling *Kermes*..... 7.
4. Female not so; or antennæ and legs wanting or more or less rudimentary..... 8.
5. Female with marginal hairs: body soft, moderately convex.... *Calymnatus*, Costa.
- Female with marginal hairs; skin hard, with large tessellations..... *Eucalymnatus*, Ckll., n subg.
(Type *Lecanium tessellatum*, Sign.)
- Female with marginal fan-shaped scales..... *Paralecanium*, Ckll.

*A continuation of the tables in CANAD. ENTOM., Nov., 1899, p. 333. This part completes the Lecaniinae.

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6. Skin microscopically tessellated; holarctic group. . . *Eulecanium*, Ckll.
Skin with polygonal areas containing pits; tropical
group. *Saissetia*, Déplanches.
7. Male scale of the *Lecanium* type; holarctic
group. *Physokermes*, Targioni.
Male scale subcylindrical, felted, with a glassy operculum; Aus-
tralian. *Cryptes*, Crawford.
8. Adult female only moderately convex; antennæ short, tapering
from a broad base; subterranean form of the
holartic region. *Lecanopsis*, Targioni.
Not so. 9.
9. Adult female covered with a more or less distinct glassy test; skin
crowded with large glands. *Neolecanium*, Parrott, n. subg.
(Type *Lecanium imbricatum*, Ckll.)
Not so. 10.
10. Mentum of female prolonged, forming a transversely corrugated
sheath. *Myxolecanium*, Beccari.
Mouth-parts normal. 11.
11. Larva greatly elongated, with parallel sides; adult female without
legs or antennæ. *Aclerda*, Signoret.
Larva otherwise; female very convex. 12.
12. Adult female dark red-brown, very convex, abdominal region con-
spicuously segmented; antennæ short and thick, 6-jointed; legs
very short, rudimentary; Australian. . . *Alecanopsis*, Ckll., n. gen.
(Type *A. filicum* = *Lecanopsis filicum*, Mask., 1893.)
Adult female not thus segmented; American. . . . *Toumeyella*, Ckll.
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SOME EXPERIMENTS IN THE EXPORTATION OF BENE- FICIAL INSECTS.*

BY F. M. WEBSTER, WOOSTER, OHIO.

I do not wish by this title to imply that there is not to be another phase to this experiment, but owing to climatic differences between Ohio and South Africa, whereby our winter months are their summer months, the export side of the problem came first. Next autumn, in South Africa, but spring with us, the tide of transportation will set in in the other direction.

Mr. Chas. P. Lounsbury, Colonial Entomologist at Cape Town, South

* Read before the Ohio State Academy of Science, Dec. 26, 1900.

Africa, visited me last summer, and, together, we perfected plans looking to the transportation of large numbers of our native Ohio Coccinellidæ to his country, with the hope of colonization there. It is but fair to say that when my former assistant, Mr. C. W. Mally, left me a year ago to take a position as Mr. Lounsbury's assistant, we planned something of the sort to be submitted to him by Mr. Mally after reaching Cape Colony, but not then expecting to be able to complete the arrangement with Mr. Lounsbury himself in Ohio.

The first consignment consisted of several hundred individuals belonging to the following species: *Megilla maculata*, *Hippodamia parenthesis*, *Coccinella 9-notata*, with scattering individuals of *H. convergens* and some *C. sanguinea*. This consignment was forwarded about the middle of October. Under date of November 14, 1900, Mr. Lounsbury writes me from Cape Town as follows: It is my pleasant duty to inform you how the Coccinellids arrived. The *Coccinella 9-notata* carried best, and fully nine-tenths of them were ready to feed. *Hippodamia parenthesis* carried next best, with say 20 per cent. mortality. The *Coccinella sanguinea* were about half of them dead, and the *Megilla maculata* about three-fourths dead.

A considerable number of *Pentilia misella*, a minute, black species, which feeds on the San José scale, were collected about Mentor, Ohio, by my assistants, and these were sent to Mr. Lounsbury at Boston, to be re-shipped by him to South Africa. Most of these succumbed before reaching Boston, and were all dead when received at Cape Town. On October 27, however, I sent a lot of some 800 individuals of this last species to Cape Town direct, and a note from Mr. Lounsbury, dated December 4, informs me that the little fellows arrived in good shape, with lots of live beetles, and enough to start a large colony. How successful we shall be in getting these Lady beetles permanently established in their far-off home remains yet to be learned.

The beetles are collected and placed in a tin box without food, and the box filled with bits of crumpled paper. The package is sent to a gentleman in New York City, so as to reach him not later than Tuesday morning. They are at once taken to the steamer and placed in a refrigerator, and the Colonial Agent in London informed of their arrival when the steamer lands at Southampton, England. A messenger is at once dispatched to Southampton and gets the package, and sees it placed in the refrigerator of a steamer bound for Cape Town, where they are promptly delivered to Mr. Lounsbury.

PERSONAL.

PROF. W. G. JOHNSON, State Entomologist of Maryland, has resigned this position in order to undertake the editorship of the *American Agriculturist*; he enters upon his new duties at the beginning of this month. His address is at the office of the *American Agriculturist*, 52 Lafayette Place, New York.

His resignation will be a very great loss to the Agricultural College of Maryland, and to the farming and horticultural interests of the State. His scientific knowledge of entomology and his practical application of it to husbandry and fruit-growing, combined with his untiring energy and boundless enthusiasm, have rendered his services as State Entomologist of more than ordinary value. His work in connection with the use of hydrocyanic acid gas as an insecticide is especially noteworthy. It is to be hoped that he will not entirely drop out of the ranks of economic entomologists, but will continue to take an active interest in the progress of this department of the science and its beneficial employment for the welfare of the community.

While we deplore the withdrawal of Prof. Johnson from the active prosecution of economic work in entomology, we are glad to know that he is to fill so important a position as the editor of one of the most influential agricultural publications in America. He will still be able to take a large share in the work of educating his countrymen to realize the importance of a knowledge of insects and their ways, and to carry out in practice for the preservation of their crops the information that has been gained by the careful studies and experiments of those devoted to the pursuit.

We desire to unite with his many friends in the wish that Prof. Johnson may meet with the utmost success in his new position, and be enabled to accomplish much good and useful work of a literary, scientific and practical character.

Mailed February 5th, 1901.

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The
Canadian Entomologist

VOLUME XXXIII.

No. 3.

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EDITED BY

REV. C. J. S. BETHUNE,

LONDON, ONTARIO.

MARCH, 1901.

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1901.

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General Index

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British Guiana.

The advertiser is now collecting insects in Guiana. Would like to hear from anyone requiring good specimens from there.

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EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

DIURNAL LEPIDOPTERA wanted from the W. and N.-W. States for diurnals from Central and Northern South America. LEVI W. MENGEL, Boys' High School, Reading, Pa.

ACULEATE HYMENOPTERA, especially Apoidea, wanted. Will give good exchange in Coleoptera or Hymenoptera. E. S. G. TITUS, Ft. Collins, Colorado.

LEPIDOPTERA (in papers) of any foreign country wanted in exchange for same of this vicinity. Send an assortment and receive same quantity. JOHN COMSTOCK, 1572 Ridge Ave., Evanston, Ill., U. S. A.

I WILL exchange a few live pupæ of Gloveri, Regalis and Inscripta, also fertile ova of Yama-mai and other Japanese moths, for live pupæ of rare Sphingides and other moths. JAMES L. MITCHELL, 212 Indiana Trust Building, Indianapolis, Indiana.

LEPIDOPTERA: Sphingidae, Arctiidae and Saturniidae of the world desired in exchange. Liberal exchange given. HENRY ENGEL, Box 369, Pittsburg, Pa., U. S. A.

WANTED.—Cicindelidae, Carabidae, and rare Scarabaeidae. Will give good exchange in Exotic and rare European Coleoptera (named), also Odonata and Hymenoptera from N. America. Send list to R. J. WEITH, Elkhart, Indiana.

DIPTERA wanted from Washington and British Columbia in exchange for North American Coleoptera. W. S. HUNTINGTON, 1910 N. Twenty-first St., Philadelphia.

PAPILIOS brevicauda, nitra, Oregonia, indra, female, nezahualcoyotl wanted; also Cicindelidae, Cychrus, Carabus and Calosoma. Will give liberally in exchange. GEO. A. EHRLMAN, 2314 Sarah Street, Pittsburg, Penna.

LEPIDOPTERA.—I have a large number of both mounted and papered specimens for exchange. All are 1900 captures. Correspondence in both English and German. Address: A. KWIAT, 701 Larrabee St., Chicago, Illinois, U.S.A.

LEPIDOPTERA, in papers, of Canada and U. S. A., wanted in good exchange for fine Lepidoptera of Europe, Asia, South America. I take only first-class quality. Please to write Smith's number upon the paper. WILHELM NEUBURGER, Lepidopterist, Berlin, S. 42, Luisen-Ufer 45, Germany.

COLEOPTERA.—Will exchange Canadian Coleoptera, in papers, for Coleoptera of U. S. and Canada. Please send lists. C. J. OUELLET, Deaf and Dumb Inst., Ville St. Louis, Montreal, P. Q.

The Canadian Entomologist.

VOL. XXXIII.

LONDON, MARCH, 1901.

No. 3

NEW HISTORIES IN HYDRÆCIA.

BY HENRY BIRD, RYE, N. Y.

(Continued from Vol. XXXII., page 283.)

Continuing under this heading, the writer would offer a few remarks subservient to a fuller knowledge of the early stages of this genus, which may be considered supplementary to some former papers that have appeared. There is some discussion at present in the current literature as to whether the term *Gortyna*, Och., should not replace *Hydræcia*, Gn., and it is to be hoped definite conclusions may be reached and the proper one fully established. The following early histories are perhaps unknown, or at any rate remain as yet unpublished.

Hydræcia inquisita, G. & R.

This is such a widely-diffused and familiarly-known species that it makes it gratifying to expose some traits of its earlier existence. So general was the poor condition of practically all examples previously seen, that the notion of its being a thin-scaled and ill-marked species had gained quite a hold on the writer. With the specimens bred last season, some light has dawned in the matter, and he would hasten to make amends in behalf of such erroneous impressions. For with conditions right, specimens, rich in a full complement of scales and attractive in their warm, red-brown colouring, were plentifully obtained. In making a choice of food-plant, the larva takes an unusual departure and makes a selection among the Cryptogamous plants, namely, *Onoclea sensibilis*, Linn. One would hardly think of associating these borers with a delicate fern, and, as may be expected, it is the roots which serve as a domicile. These latter are a bit peculiar, at least to a novice in botany. Growing slightly below and parallel to the surface, a principal root-stock creeps with rapidity, sending up fronds at various intervals. Its advancing end is green and soft, and it is to this point that the larva extends its burrow, though free access is kept up to the original entrance. An exceedingly dense growth of tough, hairy rootlets, which resembles the curled hair used by upholsterers, draws nourishment for the plant. By the time the larva has reached maturity, the part of

the root first occupied has died and become more or less decayed, and this point is sought for the pupal transformation; quite often the cell containing the chrysalis is formed among the fibrous rootlets. In no case can any exit arrangement be made, and it goes hard with those examples that have to reach daylight by passing through such a tangle. To this condition it seems possible to attribute the preponderance of rubbed specimens which are taken at light or other sources.

It may be remarked that *Hydræcia* pupæ do not attempt to reach the surface or outlet of their burrows by any process of wriggling when about to give up their imago, a circumstance frequently noted among borers in other families. So *inquasita* must reach freedom as best it may, and generally comes out the worse for wear; the only perfect examples to result from those bred were secured from those last to appear and which had been taken from their natural quarters and were placed on the surface of damp leaf-mould. So long had this species been sought in its larval state, that the ease with which its whereabouts may be known and the flagrant evidence it leaves behind as it first enters the plant make it seem ludicrous that it could have been passed by for so long. One may drive along a country road or even board a trolley car and yet note this species by the wayside. This, however, only applies to a certain season, as later there is nothing to guide one, while a search for the pupæ would be time wasted. About the first of June the young larvæ (presumed to have hibernated in their first stage) enter the frond stem and begin active operations. In a few days the root is reached and henceforth remains the only portion inhabited; in fact, the delicate stem could not long accommodate the enlarging insect. Here the list of casualties begins, as that telltale secret of a hidden larva which appears in the foliage of the plant at this period is as conspicuous to the eyes of its parasitic foes as it can be to human optics. So, a fearful percentage suffer from this source, and many more attain a violent end. *Onoclea*, with true fernlike propensities, is fond of damp places, though less so than many others, and often grows in depressions that are for a time inundated after heavy rains or showers. If we then visit an infested locality which has a low situation, the number of drowned individuals will quite appal us and our hopes of a rich harvest will receive a serious jar.

When first detected, the larva had certainly passed through at least one moult, though it was noted almost as soon as work was begun. At this period it is very delicate and slender, translucent except on the first

four abdominal segments, which are dark, somewhat purplish in hue. Lines on the thoracic joints may be faintly made out, whitish; their continuations on the last abdominal one are less so. An important individual point is that no lines, not even a faint continuation of the dorsal, cross the dark contrasting area shown on the first four abdominal segments. The head and plates are semi-transparent; but little can be made out of the tubercles, though there seems a fair complement of setæ; length .65 inch.

Next stage: The salient characteristics with *Hydracia* larvæ belonging to this section of the genus are now well exemplified. The abrupt termination of the usual dorsal and subdorsal lines on four of the middle segments leaves this space presenting the contrasting effect of a dark band or girdle, thus making it always easy to distinguish the young larvæ of this group.

Head now measures .06 inch across, a shining honey-yellow colour. Its development is normal, a few minute setæ arise on the front; a black, oblique line at the side, which takes in the ocelli, is the only marking. The thoracic shield is a shining plate as wide as the head and very nearly covers the first segment above the line of the spiracles. It is prominently edged at the lateral borders with black, which finds a continuation on the head in the line above mentioned. The tubercles are hardly definable, though their position is usually indicated by minute setæ. The anal plate is similar to the thoracic in texture, projects outwardly over the last pair of pro-legs and offers a protective shield at this extremity. The usual preceding plates on the last segment are well developed for this early stage. On the segments where they occur the ordinary lines are whitish and so wide as to overbalance the dark body colour. The spiracles are black. Larva now measures .95 inch in length.

Following stage: A marked gain in bulk is noticed, otherwise appearance remains similar. The black side line disappears from the head; the lateral tubercles come into prominence, iv is most noticeable behind the spiracles except on joint ten where it is low down. On the next to last segment i and ii have become much enlarged.

Length 1.10 inches.

Penultimate stage: Head and shields retain their respective proportions, tubercles improminent, i and ii, on all joints but the last, are the merest dots, requiring close scrutiny to observe when unaided by a lens.

The colour has faded toward the conventional translucence of maturity, though there still remains a flush of purple-brown on the first four abdominal segments. Length 1.48 inches.

Mature larva: All traces of the longitudinal lines have disappeared, its shade may perhaps be designated as a translucent flesh colour, lightest on the thoracic joints. The tubercles show no gain in importance, and compared with its congeners are not strongly defined. On the seventh abdominal segment iv is low down below the line of the spiracles, very low down, in fact, and close beside v. Other features remain as before. Head now measures .11 inch across; length of larva 1.65 inches. The actual duration of the various stages was not noted, but the entire time consumed after feeding had begun until maturity is reached was reckoned at about fifty-one days.

The pupa is similar to its allies and agrees with the regulation noctuid type. From being formed in more or less of a cell, it does not show the cylindrical shape of some others which, by reason of the small diameter of their burrows, are so confined as to be unable to assume a truly normal form. It is of the usual shining chestnut brown, with ordinary delineations. armed with a bifidate spur of slender proportions. Length .65 to .80 inch. Pupation occurs about August 20, but the species are in no way regular upon this event. Imagoes appear twenty-eight days later.

It was a matter of some gratification that the specimens bred last season proved to be partly those forms or variations of the imago having the orbicular white-marked. Previous acquaintance with local examples had only encountered those in which the ordinary spots were concolorous, and it seemed possible the species might be subject to some geographical or racial variations where these features might predominate. That this variation occurs indiscriminately and does not bear on geographical lines is slightly important, since the matter of variation in *Hydracia* is still open to some study, and any fully-established points in evidence offer a help toward final solutions.

Hydracia limpida, Gn.

This species had never been taken in this locality; in fact, the writer had not been able to secure an example from any source, so that the discovery of its larva and the subsequent acquisition of a good series of imagoes was as great a surprise as it was a pleasure. Like many of its associates which are strictly root-borers, this larva gives but a slight intimation of its whereabouts, and one is indebted to some chance incident

for its discovery. The food-plant is *Veronica virginica*, which grows sparingly in this section, and although a borer may have attained maturity in its principal root, there is often no evident deterioration of growth. Sometimes, however, the mature larva will have consumed so much of the root at its crown, to provide itself with more commodious quarters, that the stock will have died and become blackened, thus standing a mute sentinel to all who are apprised of its secret. The young borer enters the stem slightly above the ground level, where a small opening is made, furnishing air and an outlet for accumulations which would otherwise clog the gallery. Free access is kept up to this point until maturity, even though the widely-extending roots permit the larva to bore a foot or more in various directions. The roots are small for the habitation of such a guest, and it is the extended mining which they do that often results in the destruction of a specimen when the larvæ are sought for transference to the breeding cage. One never knows at what point to expect his quarry, and a fatality often occurs. Aside from this the species seemed to thrive very peacefully. The change to pupa appears to be made in the neighboring soil, and the gallery is not used as an exit by the moth, though this point has not been settled definitely, since no pupæ were obtained in the field. Larvæ were encountered in second stage from the last. They were quite as easily recognized as belonging to *Hydracia* as the preceding, having the usual characteristics well in evidence. The colour is a pale, sordid sienna; the lines dirty white; plates not strongly defined and the tubercles less so. Specimens were so scarce that this period was insufficiently observed.

Penultimate stage: Inflates were now secured and definite notes taken. This next to last stage is the most important in making comparisons in this genus, as the individuality fades later into a very general translucence, though of course the tubercle arrangement and structural details still point to their specific attributes.

Larva now shows some points in common with its near ally *cerussata*, though the size and colour are quite dissimilar. On the thoracic joints the skin is puckered or creased, so as to appear slightly contorted, and all tubercles or plates are well defined; the anal plate, however, does not show the departure occurring with its ally.

Head measures .08 inch; regular, smooth and shining; of a honey-yellow colour, the mouth-parts alone showing tipped with brown; there seems a full complement of setæ, but the side or ocellar line is wanting.

Body is slender, of the usual cylindrical build, the constrictions of the thoracic regions are already noted. Colour as in earlier stage, a pale sienna, in some specimens showing rather pink on the first four abdominal joints. This area is not crossed by the longitudinal lines. These latter are whitish; on the thoracic segments they are rather confused, their continuation on the rear abdominal ones shows well-defined and regular. Thoracic shield a little wider than the head, of the same shining, corneous texture, edged faintly at the sides with brown; anal plate is similar, smooth and shining, its setæ of usual prominence. The tubercles are all well defined, of an umber shade, iv the largest of the lateral ones. On joints two and three, iii, iv and v are clustered in their triangular setting, and by reason of their large size, especially iv, almost touch one another. On all segments but the next to last, i and ii are small, as is customary, and show somewhat darker. On joint eleven these are very large and placed in quadrangular form. The plates preceding the anal one are barely cut in twain by a thread of the dorsal line. The spiracle on joint one is most conspicuous by reason of the lighter colour of this segment, and it is entirely black. The other spiracles show a light centre and have their elliptical margin ringed with black. On the seventh abdominal segment there are five tubercles clustered around the spiracle. What had previously been considered as a raising of iv, in some cases, to the upper corner of the spiracle, seems now very plainly the acquisition of an accessory tubercle at this point, the normal iv all the while retaining its usual position on this segment, lower down. But this additional one is as fully developed as iv is on this or the preceding joints, and its placing corresponds identically with the arrangement as occurring on joints four to eight. With two other species this additional tubercle first appears in this penultimate stage, iv previously occupying its lower position and remaining unchanged after entering the stage, the additional tubercle now appearing, but causes no alteration with the normal iv. We may designate this acquisition as iv a, looking upon its arrival in the same light as the other cases cited, though observations with *limpida* were insufficient to say at what time it was acquired. Larva now measures 1.38 inches.

Final stage: There appears no structural change from the preceding period. The lines disappear, a flesh-coloured translucence is now the tint. The spiracles, tubercles and true-legs are all black; the shields are unchanged. Length 1.63 inches. Larvæ attain full growth by August 19.

The pupa is formed in the adjoining soil, at least this happened with the examples in confinement. It shows no departure from the usual form, agreeing very well with the preceding species. Length .90 inch.

No larval history so far encountered has been quite so satisfactory to the writer, nor possibly of greater general importance than this meeting with *limpida*. From the date of its first conception a certain haziness existed regarding the species. Guenée himself was not sure of its distinctness, though his fear of its being a variety of *marginidens* or *nebris*, simply because they were all white-spotted forms, has proved to be groundless. Prof. Grote sees it in another light, and in naming his *cerussata*, pauses over the matter lest his newer term might be simply a more robust form of the Guenée species. Yet the differentiation has proved correct. With the recent "Revision," by Prof. Smith, and the more abundant material of this later date, the specific distinctness of the two are not questioned by him, though there seems no strong line to be drawn between the two.

Adding to this the many queries received from all sides, makes it seem worth while devoting a word in these pages to descriptive detail, since the literature is in no way burdened with a reference to this species. An eminent lepidopterist long ago gave me a translation of the original description, which is as follows: "♂ 26 mil., ♀ 40 mil. Fore wings very entire, of a deep brownish black with traces of ordinary lines. Subterminal line marked at apex by a vague yellowish point. Reniform white, divided by brown threads and shaded centrally with yellowish; the three outer spots white like the preceding species (*marginidens*), nearly even. Hind wings similar in both sexes, whitish, a little transparent, with external margin and veins brownish. Beneath the four wings gray, powdered with brown, with dark mesial lines. Thorax gray, no white spots at the base of the primaries. Illinois; Coll., Doubleday."

Fresh examples of *limpida* are beautiful insects indeed; there is a certain violet tint pervading its colouring, which, unfortunately, soon fades, and the contrasting white spots tempered by a fleck of cream, together with an exceedingly trim appearance, quite captivate one upon first meeting the species. The mention of the hind wings being "whitish, and a little transparent," should not be misleading, as they are in fact much less smoky than *cerussata*, more silky, and with worn or badly-faded material could easily be construed into a certain semi-transparency. The salient feature of the description is the remark noting the absence of any

white in the basal area. Rye specimens are plainly typical in this respect, for this latter feature is somewhat a departure from the general rule and at once becomes noticeable. In the "Revision," specimens having a white basal line or a few whitish scales here, together with a more reddish tinge of the median field, are described and show to some extent how to gauge our conception of its variation.

But this is along the conventional lines upon which variation occurs in the group. The prevalence or absence of white in the basal area, the orbicular, claviform and reniform spots, and finally in the scales at the base of the antennæ, is not a point by which any very rigid rule can hold. Examination of a good series of any of the allied species will soon show this, yet individually this variation is not so great—it is in the mixing of the species wherein results confusion. Perhaps the greatest point of specific constancy as we glance superficially at a collection, though apparently a very insignificant matter, is the general hue or tint of the body vestiture (applicable only with fresh specimens), and secondly, the wing outline is important. But, fortunately, we are not dependent on conceptions of varying shades and colours, since individual opinions differ in such matters and colour-blindness exists to a wide degree—rather may we rejoice that these closely-related species cannot always mystify us, but in their larval stages show departures easy of recognition.

The unravelling of these early histories seems necessarily a slow task and one which often brings the student under, to him, an amusing criticism, since it becomes so necessary to dig and delve in such a varied number of locations—be it the side of the village turnpike or a neglected corner of a country churchyard—and one frequently hears the passer-by remark upon the sad affliction of being "slightly touched on the subject of bugs and all that." But with success as a reward to our efforts, such remarks only elicit a smile, and we are well satisfied indeed if we have but found our quarry.

THE THIRTY-FIRST ANNUAL REPORT of the Entomological Society (1900) has just been published by the Ontario Department of Agriculture. In its pages will be found many articles of an interesting and important character, dealing for the most part with entomological subjects of a practical nature.

THE GENERAL INDEX to the Thirty Annual Reports, 1870 to 1899, is now on sale by the Society. Price (including postage): unbound, 25 cents; bound in black cloth, 50 cents.

SOME PLANT-LICE AFFECTING PEAS, CLOVER AND LETTUCE.

BY E. DWIGHT SANDERSON, NEWARK, DEL.

(Continued from page 39.)

LETTUCE APHIDS.

Nectarophora lactuca, Walk.

(Pl. III., 8.) Several writers have listed *S. lactuca*, Kalt. as an American species. That of Thomas is noted below. Dr. J. B. Smith gives the species in his Insects of New Jersey. Whether the species occurs in this country or not is open to question. It should be noted here that Kaltenbach's *Aphis lactuca* is a *Rhopalosiphum*. Buckton gives both *Siphonophora lactuca*, Kalt. and *Rh. lactuca*, Kalt., though Kaltenbach described but one species. Walker (Ann. and Mag. Nat. Hist., Ser. 2, p. 49, 1849) in his description of the species confused it with *Rh. lactuca*, Kalt., as Passerini has pointed out. Walker described it as *Aphis lactuca*, Linn. and as a synonym of *A. lactuca*, Kalt., though Kaltenbach had already shown *A. lactuca*, Linn. to have been invalid, and that his species was entirely distinct. Walker also gives *A. ribis-nigri*, Mosley (Gard. Chron. I., 684) as a synonym. Mosley's description is hardly recognizable, but evidently is the same as some of the varieties described by Walker, both undoubtedly referring to *Rhopalosiphum ribis*, Linn., and *Myzus ribis*. Unfortunately, Walker describes only the coloration of his species. Part of his species is evidently, however, *N. lactuca*. Passerini's description is too brief to be recognizable, but probably refers to the same species, as Buckton thought. Why Buckton described the species as *S. lactuca*, Kalt., is not clear. Buckton follows Walker in giving *Ribes nigrum* and *grossularia* as food-plants, and remarks that Walker states that the cornicles are enlarged at the middle, but does not otherwise seem to confuse the species with others as did Walker. Mr. Buckton has kindly loaned me specimens which correspond very closely with his description. The slide is labelled, "(18) *A. R. Siphonophora lactuca*," and "*S. lactuca*, Walk." They are as follows:

Winged Viviparous Female.

Length, 2.32 mm.; width, 0.82 mm.; antennæ, 3.10 mm.; III., 0.73 mm., IV., 0.50 mm., V., 0.41 mm., VI., 0.12 mm., VII., 1.11 mm.; Tibia, I., 1.35 mm., II., 1.45 mm., III., 1.85 mm.; Cauda, 0.19 mm.;

Cornicles, 0.50 mm.; Wing expanse, 7.50+mm.; Beak extending to mesocoxæ.

Antennæ dark, III. and IV. with sensoria, hairs capitate; legs light, tips of femora and tibia, and tarsi dark, some of hairs on legs capitate; cornicles straight, cylindrical, reaching to or slightly beyond tip of cauda, darkish at bases and tips, cauda dark; lateral edges of abdomen with black spots, abdominal segments banded and irregularly marked with dark, bases of setæ in lateral spots and of two dorsal setæ on caudal segments, large and conspicuous. Two specimens.

Apterous Viviparous Female.

Length, 2.5 mm.; width, 1.30 mm.; antennæ, 2.65 mm.; III., 0.63 mm., IV., 0.48 mm., V., 0.38 mm., VI., 0.10 mm., VII., 0.92 mm.; Tibia, I., 1.2 mm., II., 1.35 mm., III., 1.70 mm.; Cauda, 0.28 mm.; Cornicles, 0.57 mm.; Rostrum extending to between meso- and metacoxæ.

Antennæ light, joints, tip of V., VI. and VII. dark, III. with sensoria, abdomen unmarked. One specimen.*

This species is readily distinguished from the allied American *Nectarophora* described above by the sensoria on IV. of the antennæ of the winged female, and by the larger number (12 or so) of sensoria on III. of the apterous female.

Kaltenbach and Buckton both consider *S. lactuca*, Koch., as probably *S. sonchii*, Linn.

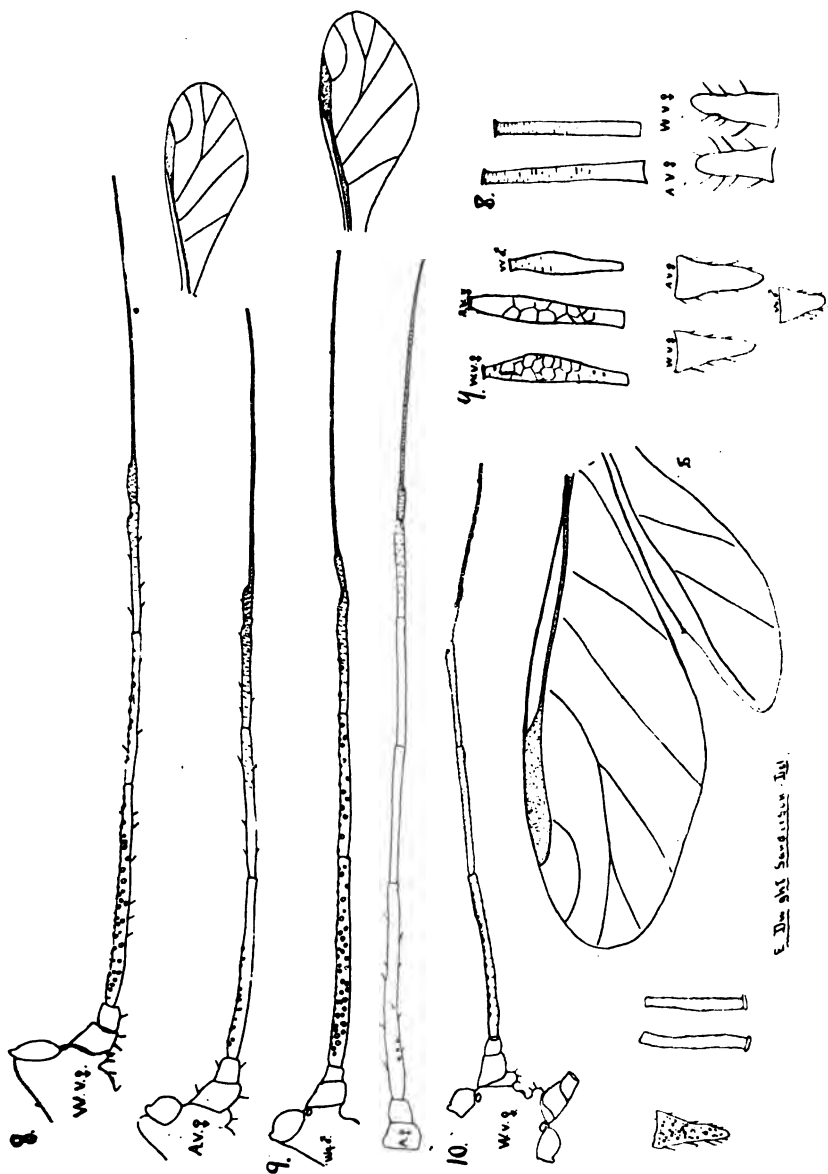
Rhopalosiphum ribis, Koch., is probably *Myzus ribis*.

Rhopalosiphum lactuca, Kalt.

(Pl. III., 9.) This species was taken October 27, 1899, on *Sonchus oleraceus* at Newark, Del., in large numbers, and was kindly determined by Mr. Th. Pergande. It corresponds closely to Buckton's description. Many of the nymphs and pupæ were pink. No search was made for the sexes at the time, but several males have been found in the preserved material. No oviparous females were found, and apterous females were scarce. The males and winged females seem to be almost absolutely alike in size and markings.

Winged Male.—Length, 2.20 mm.; width, 1.00 mm.; antennæ, 2.95 mm., III., 0.71 mm., IV., 0.51 mm., V. 0.46 mm., VI., 0.12 mm., VII.,

* The number of specimens mentioned under each species refers to the number of perfect specimens from which the description was drawn; a much larger number are preserved of most of them.



1.20 mm.; Tibia, I., 1.25 mm., Cauda, 0.21 mm.; Cornicles, 0.34 mm.; III., IV. and V. with numerous sensoria. Two specimens.

Winged Viviparous Female.—Length, 2.56 mm.; width, 1.00 mm.; antennæ, 2.75 mm., III., 0.74 mm., IV., 0.50 mm., V., 0.40 mm., VI., 0.12 mm., VII., 0.84 mm.; Tibia, I., 1.10 mm., III., 1.66 mm.; Cauda, 0.28 mm.; Cornicles, 0.44 mm.; III., IV. and V. with numerous sensoria. Five specimens.

Apterous Viviparous Female.—Length, 2.7 mm.; width, 1.30 mm.; antennæ, 2.55 mm., III., 0.72 mm., IV., 0.47 mm., V., 0.33 mm., VI., 0.11 mm., VII., 0.84 mm.; Cauda, 0.29 mm.; Cornicles, 0.53 mm.; Rostrum extending to mesocoxæ; two or three sensoria on III.* Three specimens.

Myzus Pergandii, n. sp.

Winged Viviparous Female. (Pl. III., 10., Fig. 5.)

Wing expanse, 7.00 mm.; length, 1.69 (1.25–2.00) mm.; width, 0.71 (0.50–0.85) mm.; antennæ, 2.07 (1.60–2.10) mm., III., 0.52 (0.40–0.60) mm., IV., 0.43 (0.30–0.46) mm., V., 0.30 (0.24–0.34) mm., VI., 0.15 (0.14–0.16) mm., VII., 0.56 (0.42–0.62) mm.; Tibia, I., 0.96 (0.70–1.10) mm., II., 0.94 mm., III., 1.28 (1.00–1.50) mm.; Cauda, 0.19 (0.15–0.23) mm.; Cornicles, 0.36 (0.28–0.40) mm.

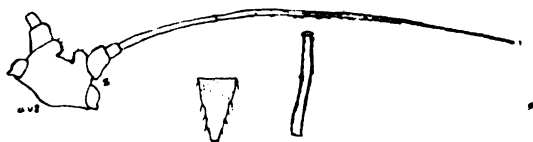


FIG. 5.—*Myzus Pergandii*, n. sp.: Antenna, cauda and cornicle of apterous viviparous female.

Head, antennæ, thoracic dorsal, lateral, and ventral sclerites, distal half of femora, tips of tibia, tarsi, and cornicles, black; membrane of thorax brownish, as are legs; abdomen dirty white, marked with three large lateral blackish spots in front of cornicles, a large dark spot dorsally covering segments three, four, and five, with two lateral branches on either side, segments six and seven dark, eight light with small dark band, cauda and ventral plates dark, eyes black; small brown ring at base of III. (antennal segment), 12 to 15 sensoria on III.; stigma brown, slightly smoky. Twelve specimens.

Apterous Viviparous Female.

Length, 1.85 (1.50–2.10) mm.; width, 1.05 (0.90–1.10) mm.; antennæ, 1.80 (1.75–2.20) mm., III., 0.48 (0.40–0.64) mm., IV., 0.37 (0.35–0.41) mm., V., 0.25 (0.20–0.32) mm., VI., 0.13 (0.10–0.15) mm., VII., 0.45 (0.38–0.54) mm.; Tibia, I., 0.81 (0.70–1.00) mm., II., 0.83 (0.70–1.00) mm., III., 1.15 (0.93–1.40) mm.; Cauda, 0.20 (0.16–0.22) mm.; Cornicles 0.50 (0.48–0.60) mm.; Rostrum extending to mesocoxæ. Eyes, tips of cornicles, and tarsi black, otherwise pure whitish, with indistinct greenish mesal stripe on abdomen, sometimes with a few capitate hairs on caudal segments, tibia, and head; no lateral tubercles; antennæ lie flat over back when at rest, and the gibbous tubercles are thus bent upwards. Thirteen specimens.

This species is closely allied to *M. achyrantes*, Monell (*M. malvæ*, Oest.), as described by Monell and Oestlund. The apterous females are distinguished from it by the longer antennæ, which are whitish, eyes black instead of red-brown, and abdomen whitish instead of pea-green as in *malvæ*. The winged female is distinguished by having the inner angles of I. straight or but slightly rounded, VII. slightly longer than III., and cornicles black. The apterous females are very similar to *Siphonophora calendulella*, Monell, but the description of that species is too brief to be recognizable. Monell mentions that a species closely allied to *S. achyrantes* occurs on lettuce.

The winged females bear a resemblance to *Rhopalosiphum dianthi*, Schr., but are smaller, the cornicles are not swollen and are black, and only III. bears sensoria, while Oestlund describes the winged *dianthi* as having sensoria on III., IV. and V.

Specimens of this species were kindly loaned me by Prof. W. G. Johnson, from Baltimore Co., Md., collected on lettuce, February, 1899; were found by me on garden peas, November 1, 1900, at Newark, Del., and were collected by Prof. G. H. Powell, May 3, 1897, on eggplant under glass—to which they were doing considerable injury—at the same place.

The description given by Thomas under *Siphonophora lactuæ*, Kalt., refers either to this species or *M. achyrantes*, Monell.

Types deposited in the U. S. Nat. Muséum. Type No. 5422.

EXPLANATION OF PLATES.

Plate II. (page 34).

1. "*Siphonophora pisi*," from G. B. Buckton.

2. "*Siphonophora pisi* (?)," from G. B. Buckton.
3. (*Nectarophora destructor*, Johns.)
4. *N. pisi*, var. *reticulata*.
5. *N. pisi*, var. from Iowa :
A, apterous viviparous female ; W, winged viviparous female ;
M, male ; a, antenna ; ca, cauda ; cl, cornicle ; wg, wing ; sp,
spring.

(From camera lucida drawings by the author.)

Plate III.

8. "*Siphonophora lactuca*, Walk.," from G. B. Buckton.
9. *Rhopalosiphum lactuca*, Kalt.
10. *Myzus Pergandii*, n. sp.

(From camera lucida drawings by the author.)

CICADIDÆ — AMERICAN GENERA AND SPECIES.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

The following bibliographical catalogue was prepared several years ago, and thinking that other workers might find it of use, it is offered for publication at this time. A table of the genera, compiled from the writings of various systematists who have dealt with this family, is added to make the paper more complete.

TABLE OF GENERA.

- A. Lateral margins of the pronotum not angulately dilated.
 - b. Basal abdominal segment of the male not expanded or dilated above so as to conceal the timbal or drum ; the operculum usually rudimentary or wanting.
 - c. The ulnar* veins coalesced at base ; tegmina with eight apical cells. *Melampsalta*, Kol.
 - cc. The ulnar veins not coalesced at base.
 - d. The first apical cell of the tegmina distinctly longer than the second *Tibicen*, Latr.
 - dd. The first and second apical cells of tegmina equal.
 - e. Costal margin of the tegmina very convex ; second ulnar cell large and triangular ; the posterior wings with six apical cells *Platypedia*, Uhl.

*See Stal, Hemip. Afr., IV., p. 264, for terminology of wing veins.

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- ee. Costal margin of the tegmina only very slightly convex.
 - f. The posterior wings with four apical cells* *Prunasis*, Stal.
 - ff. The posterior wings with five apical cells *Calyria*, Stal.
 - bb. Basal abdominal segment of the male expanded or dilated above so as to conceal the timbal ; the operculum well developed.
 - c. The cross-vein at the base of the second apical cell of the tegmina not oblique, forming right angles with the longitudinal veins *Proarna*, Stal.
 - cc. The cross-vein at the base of the second apical cell oblique, forming angles greater or less than a right angle with the longitudinal veins.
 - d. The postcostal marginal and the postcostal ulnar veins not parallel, more distant towards the apex.
 - e. Metasternum not at all or slightly elevated at middle, elevated part not produced in front at middle *Tympanoterpes*, Stal.
 - ee. Metasternum transversely elevated, elevated part longitudinally impressed, slightly produced in front, the produced part truncate or sinuate . . . *Fidicina*, A.-S.
 - dd. The postcostal marginal and the postcostal ulnar veins parallel, not more distant towards the apex.
 - e. Basal area of the tegmina rarely twice as long as wide ; apex of the clypeus truncate or subsinuate truncate *Cicada*, Linn.
 - ee. Basal area of the tegmina twice as long as wide ; apex of the clypeus subacuminate or very slightly rounded *Tettigia*, Kol.
 - AA. Lateral margins of the pronotum angulately dilated.
 - b. Ulnar veins contiguous at base, interior ulnar area narrowed at base *Zammara*, A.-S.
 - bb. Ulnar veins distant at base, interior ulnar area with its sides subparallel *Odopoea*, Stal.
-

*Stal is not consistent regarding the number of apical cells in this genus: in his original description, Rio Jan. Hem. Faun., II., 22, he says, "*Alae areolis apicalibus quattuor*, and in Hemip. Africana, IV., 9, says, *Alis areis apicalibus sex*, while Ashmead, Entomol. Amer., IV., 141, says, "Elytra with 4 apical cells."

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Tettigetta, Kol.
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calliope, Walk.
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 Habitat—Missouri, Georgia, Illinois, Kansas, Gulf States, Tennessee, Louisiana, Texas, Nebraska, North Carolina.

PLATYPEDIA, Uhler.

1888. Uhler, Ent. Amer. IV., 23.
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areolata, Uhl.
 1861. *Cicada*, Uhler, Proc. Acad. Nat. Sci. Philad., 285.
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 Habitat—Utah, California, Nevada, Washington.
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 Habitat—Colorado, Utah, Nevada.
minor, Uhl.
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 Habitat—Southern California.

PRUNASIS, Stal.

1861. Stal, Bidr. Rio Jan. Hem. Faun. II., 22.
1866. Stal, Hemip. Afr. IV., 9.
venosa, Uhl.
1888. *Prunasis*, Uhler, Ent. Amer. IV., 82.
Habitat—Texas.

TIBICEN, Latr.

1817. Latreille, Reg. Anim. III.
1866. Stal, Hemip. Afr. IV., 25.
Blaisdelli, Uhl.
1892. *Tibicen*, Uhler, Trans. Md. Acad. Sci., 163.
Habitat—California.
Canadensis, Prov.
1889. *Cicada*, Provancher, Petite Faun. Ent. Can. III., 213; pl. V., 1.
1892. *Tibicen*, Uhler, Trans. Md. Acad. Sci., 165.
Habitat—Ontario, Canada.
cruentifera, Uhl.
1892. *Tibicen*, Uhler, Trans. Md. Acad. Sci., 161.
Habitat—Nevada.
cupreosparsa, Uhl.
1888. *Tibicen*, Uhler, Trans. Md. Acad. Sci., 43.
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Habitat—California.
hesperia, Uhl.
1876. *Cicada*, Uhler, Bul. U. S. Geol. Geog. Surv. II., 76.
1892. *Tibicen*, Uhler, Trans. Md. Acad. Sci., 161.
‡ *hesperia*, Worth.
1888. *Tibicen*, Woodworth, Psyche, V., 68. = *rimosa* Say.
Habitat—Colorado, Nevada, California.
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novaboracensis, Em.
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Habitat—Missouri, Arkansas, Utah.

septendecim, Linn.

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costalis, Fab.
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 1803. *Tettigonia*, Fabricius, Syst. Rhyng., 39.
 1869. *Tibicen*, Stal, Hemip. Fabr. II., 116.
 1892. = *septendecim* Linn., Uhler, Trans. Md. Acad. Sci., 160.
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cassinii, Fisher.
 1851. *Cicada*, Fisher, Proc. Acad. Nat. Sci. Philad. V., 272.
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 Habitat—East of the Rocky Mountains.

striatipes, Hald.

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 Habitat—Utah.

synodica, Say.

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 Habitat—Colorado, Illinois.

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Habitat—Mexico, Texas.

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Habitat—Texas, Arizona.

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gigas, Oliv.1790. *Cicada*, Oliver, Enc. Meth. V., 759; pl. III., 4.1881. *Tympanoterpes*, Distant, Biol. Cent. Amer. Homop., 14.
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triupsilon, Walk.1850. *Cicada*, Walker, Cat. Brit. Mus. Homop. I., 103.1892. = *gigas* Oliv., Uhler, Trans. Md. Acad. Sci., 147.
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Habitat—Rio Grande Region of Texas, Mexico, West Indies, South America.

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Habitat—Southern Texas, Mexico, Brazil.

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 Habitat—Konza Indian Settlement, ? Nebraska.

biconica, Walk.

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 Habitat—Florida, West Indies, Mexico.

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 1881. *Cicada*, Distant, Biol. Cent. Amer. Homop. 7 ; pl. III., 1.
 1892. *Cicada*, Uhler, Trans. Md. Acad. Sci., 154.
 Habitat—Key West, Florida ; Costa Rica, Mexico, Lower California.

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 Habitat—East Rocky Mountains.

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1892. *Cicada*, Uhler, Trans. Md. Acad. Sci., 156.
 Habitat—New Mexico, California.

dorsata, Say.

1825. *Cicada*, Say, Journ. Acad. Sci. Philad. IV., 331.
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 1855. *Cicada*, Fitch, Rept. N. Y. St. Agr. Soc. XIV., 745.
 1856. *Cicada*, Fitch, Rept. Inj. Ins. N. Y. I., 41.

1888. = *dorsata* Say, Woodworth, Psyche, V., 68.

Habitat—Missouri, Colorado, Illinois to Texas, New Mexico.

marginata, Say.

1825. *Cicada*, Say, Journ. Acad. Nat. Sci. Philad. IV., 330.

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figurata, Walk.

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1892. = *marginata* Say, Uhler, Trans. Md. Acad. Sci., 150.

Habitat—New York to Northern Florida, Gulf States, Texas,
Arkansas, Missouri, Colorado, Utah.

Montezuma, Dist.

1881. *Cicada*, Distant, Biol. Cent. Amer. Homop., 8 ; pl. II., 2.

1892. *Cicada*, Uhler, Trans. Md. Acad. Sci., 154.

Habitat—Texas, New Mexico, Arizona, California, Mexico.

pallida, Dist.

1881. *Cicada*, Distant, Biol. Cent. Amer. Homop., 8 ; pl. II., 7.

1892. *Cicada*, Uhler, Trans. Md. Acad. Sci., 153.

Habitat—Texas, Mexico.

reperta, Uhl.

1892. *Cicada*, Uhler, Trans. Md. Acad. Sci., 177.

Habitat—Florida, North Carolina, Louisiana.

rudis, Walk.

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 1881. *Cicada*, Distant, Biol. Cent. Amer. Homop., 8; pl. II., 20.
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Habitat—Eastern Mexico, ? Arizona.

sordidata, Uhl.

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Habitat—Florida.

superba, Fitch.

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Habitat—Indian Territory, Central Texas, New Mexico.

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 1869. *Cicada*, Stal, Hemip. Fabr. II., 6.

lyricen, DeG.

1778. *Cicada*, DeGeer, Ins. III., 212; pl. XXII., 23.
 1850. = *tibicen* Linn., Walker, Cat. Brit. Mus. Homop. I., 94.

variegata, Fabr.

1794. *Cicada*, Fabricius, Ent. Syst. IV., 19.
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 1830. *Cicada*, Germar, Thon. Ent. Archiv. II., 4.
 1869. *Cicada*, Stal, Hemip. Fabr. II., 116.
 1892. = *tibicen* Linn. Uhler, Trans. Md. Acad. Sci., 149.

opercularis, Oliv.

1790. *Cicada*, Oliver, Enc. Meth., 749.
 1869. = *tibicen* Linn., Stal, Hemip. Fabr. II., 6.

pruinosa, Say.

1825. *Cicada*, Say, Journ. Acad. Nat. Sci, Philad. IV., 330.
 1859. *Cicada*, LeConte, Comp. Writ. Say, II., 251.
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‡*brunneosa*, Wild.1852. *Cicada*, Wild, Ann. Soc. Ent. Fr. (2), V., Bul. XVIII.1850. *Cicada*, Walker, Cat. Brit. Mus. Homop., Suppl., 20.1892. = *tibicen* Linn., Uhler, Trans. Md. Acad. Sci., 149.

Habitat—North America.

transversa, Walk.1850. *Cicada*, Walker, Insecta Saunders. Homop., 15.*alacris*, Stal.1864. *Cicada* Stal, Stett., Ent. Zeit. XXV., 62.1892. = *transversa* Walk., Uhler, Trans. Md. Acad. Sci., 155.

Habitat—Texas, Mexico.

vitripennis, Say.1830. *Cicada*, Say, Journ. Acad. Nat. Sci. Philad. VI., 236.1851. *Cicada*, LeConte, Comp. Writ. Say, II., 372.1892. *Cicada*, Uhler, Trans. Md. Acad. Sci., 153.‡*albipennis*, Worth.1888. *Cicada*, Woodworth, Psyche, V., 68.

Habitat—Arkansas, Arizona, New Mexico, Texas, Louisiana, Florida.

TETTIGIA, Kol.

1857. Kollenati, Mel. Ent. VII., 6.

1866. Stal, Hemip. Afr. IV., 23.

hieroglyphica, Say.1830. *Cicada*, Say, Journ. Acad. Nat. Sci. Philad. VI., 235.1859. *Cicada*, LeConte, Comp. Writ. Say, II., 371.1888. *Tettigia*, Uhler, Ent. Amer. IV., 22.*characteria*, Germ.1830. *Cicada*, Germar, Thon. Entom. Archiv. II., 4.1888. = *hieroglyphica* Say, Uhler, Ent. Amer. IV., 22.*johannis*, Walk.1850. *Cicada*, Walker, Cat. Brit. Mus. Homop. I., 149.1888. = *hieroglyphica* Say, Uhler, Ent. Amer. IV., 22.*sexguttata*, Walk.1850. *Cicada*, Walker, Cat. Brit. Mus. Homop. I., 154.1888. = *hieroglyphica* Say, Uhler, Ent. Amer. IV., 22.

Habitat—Pennsylvania, New Jersey to Florida, Alabama, Mississippi, Louisiana, Texas.

ZAMMARA, A. & S.

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smaragdina, Walk.

1850. *Zammara*, Walker, Cat. Brit. Mus. Homop. I., 33.
1881. *Zammara*, Distant, Biol. Cent. Amer. Homop. 3 ; pl. I., 1.
1888. *Zammara*, Woodworth, Psyche, V., 67.
1892. *Zammara*, Uhler, Trans. Md. Acad. Sci., 174.
angulosa, Walk.
1850. *Zammara*, Walker, Cat. Brit. Mus. Homop. I., 34.
1888. = *smaragdina* Walk., Woodworth, Psyche, V., 67.
Habitat—California, Mexico.
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PRACTICAL ENTOMOLOGY.

A CONTRIBUTION TO THE STUDY OF THE INSECT FAUNA OF HUMAN EXCREMENT (with especial reference to the Spread of Typhoid Fever by Flies). By L. O. Howard, Ph.D. Proc. Washington Acad. Sciences, December 28, 1900. Royal 8vo., pp. 60, fig. 22, plates 2.

This paper, just issued by Dr. L. O. Howard, the United States Entomologist, is of enormous and far-reaching importance. The subject is, undoubtedly, at first sight an unpleasant one ; but it is of such intense interest to all, that it becomes the duty of anyone who appreciates the bearing of this paper to draw public attention to it, as a source of authoritative and definite information on a subject which may affect the health of every individual in every community, especially where many human beings are gathered together, as in military camps and large cities. Moreover, this paper indicates a ready means, always available, by which the spread of typhoid fever, cholera and other kindred diseases may be to a large extent prevented. It has for some time been recognized by advanced physicians and some few others, that "flies" are the direct agents in the distribution of some diseases ; but Dr. Howard, by the investigations which are here summarized, proves what kinds of flies are responsible for this evil, shows the way in which they do it, and points out how it may be prevented. The present contribution is a record of actual observations by Dr. Howard and his assistants at Washington, aided by correspondents in many parts of the United States. Dr. George M. Sternberg, Surgeon-General of the U. S. Army, and other high medical authorities are cited, showing the importance of the careful and regular treatment of fæcal matters in large encampments, and instances are given of the fatal results of neglecting the precautions recommended.

Dr. H. A. Veeder, in a paper entitled "Flies as Spreaders of Disease in Camps." published in the New York Medical Record of September 17, 1898, brought together a series of instances and strong arguments in favour of his conclusion that flies are prolific conveyers of typhoid under improper camp conditions.

In Dr. G. M. Sternberg's circular No. 1, published April 25, 1898, explicit directions were given to army surgeons regarding sinks, which, if explicitly followed, would have prevented the spread of typhoid by flies. Two sentences may be quoted from this circular: "Sinks should be dug before a camp is occupied, or as soon after as practicable. The surface of faecal matter should be covered with fresh earth or quicklime or ashes three times a day. No doubt typhoid fever, camp diarrhoea, and probably yellow fever, are frequently communicated to soldiers in camp through the agency of flies, which swarm about faecal matter and filth of all kinds deposited upon the ground or in shallow pits, and directly convey infectious material, attached to their feet or contained in their excreta, to the food which is exposed while being prepared at the common kitchen or while being served in the mess tent." Thus the Surgeon-General not only gave sound instructions, but stated his reasons for these instructions:

"In 1898 an epidemic occurred in the camp of the Eighth Cavalry at Puerto Principe, Cuba, in which 250 cases of the fever occurred. The disease was imported by the regiment into its Cuban camp, and Dr. Walter Reed, U. S. A., upon investigation, reported to the Surgeon-General that the epidemic 'was clearly not due to water infection, but was transferred from the infected stools of the patients to the food by means of flies, the conditions being especially favorable for this manner of dissemination.'

"The agency of flies in the transmission of Asiatic cholera was convincingly shown at an early date by the observations of Tizzoni and Cattani, Sawtchanko, Simmonds, Uffelmann, Flugge and Macrae, while Celli had shown as early as 1888 that flies fed on the pure cultures of *Bacillus typhi abdominalis* were able to transmit virulent bacilli into their excrement."

Owing to the prevalence of typhoid in the United States Army during the summer of 1898, an Army Typhoid Commission was appointed in that year, at the request of the Surgeon-General. The report of this Commission has not yet been published, but one of the members, Dr. Victor M. Vaughan, U. S. V., read before the annual meeting of the

American Medical Association, at Atlantic City, New Jersey, June 6, 1900, a paper entitled "Conclusions Reached After a Study of Typhoid Fever Among American Soldiers in 1898." This paper, which is one of the most important contributions to the study of enteric fevers published, comprises 53 categorical conclusions. The one relating to flies is as follows :

"27. Flies undoubtedly served as carriers of the infection.

"My reasons for believing that flies were active in the dissemination of typhoid may be stated as follows :

"*a.* Flies swarmed over infected faecal matter in the pits and then visited and fed upon the food prepared for the soldiers at the mess tents. In some instances, where lime had recently been sprinkled over the contents of the pits, flies with their feet whitened with lime were seen walking over the food.

"*b.* Officers whose mess tents were protected by means of screens, suffered proportionately less from typhoid fever than did those whose tents were not so protected.

"*c.* Typhoid fever gradually disappeared in the fall of 1898, with the approach of cold weather and the consequent disabling of the fly.

"It is possible for the fly to carry the typhoid bacillus in two ways. In the first place, faecal matter containing the typhoid germ may adhere to the fly and be mechanically transported. In the second place, it is possible that the typhoid bacillus may be carried in the digestive organs of the fly and may be deposited with its excrement."

The miasmatic theory of the origin of typhoid fever was not supported by the investigations of the Commission, and it was found that infected water was not an important factor in the spread of typhoid in the national encampments of 1898. The conclusion was reached that the fever is disseminated by the transference of the excretions of an infected individual to the alimentary canals of others, and that a man infected with typhoid fever may scatter the infection in every latrine, or regiment, before the disease is recognized in himself, while germs may be found in the excrement for a long time after the apparent complete recovery of the patient. The remarkable statement is made that in the encampments of 1898 about one-fifth of the soldiers developed typhoid, and that more than 80 per cent. of the total deaths were caused by this fever.

In all medical and newspaper literature on this subject the expression used in connection with insects has been simply "flies." It occurred to

Dr. Howard, in 1898, that from the scientific and practical points of view there was a distinct necessity for careful investigation of the insects which breed in human fæces, or are attracted to them; such an investigation was consequently begun in 1898 and carried on through 1899 and part of 1900. It is the results of this investigation which Dr. Howard now presents.

In summing up, Dr. Howard states that the number of insects found breeding in or frequenting human excrement was very large. There were many coprophagous beetles—44 species in all—and many hymenopterous parasites of beetles and flies, but these were not thought to have any importance from the disease-transfer standpoint. Of flies there were studied in all 77 species, of which 36 were found to breed in human fæces, while 41 were captured upon them.

The practical bearing of the work is brought out when we consider which of the forms are likely from their habits to actually carry disease germs from excrement, in which they have bred or which they have frequented, to food substances upon which human beings feed. Therefore, extensive collections of flies were made in pantries, kitchens, etc., by means of sticky fly-papers. No less than 23,087 flies were examined, of which 22,808 were the ordinary house fly, *Musca domestica*. A complete list is given of all species bred on or taken during the investigation, including a full account of the common house fly and its habits. There are excellent figures of many species, together with a great deal of information which will be of interest to scientific readers.

Dr. Howard points out that, although the most abundant species found breeding in or attracted to human excrement do not occur in kitchens and dining-rooms, yet the common house fly, notwithstanding the fact that it prefers horse manure as a breeding place, does, under some circumstances, as in army camps, where human excrement is left exposed, breed in that substance in large numbers, and, as it also is much attracted to food supplies, it may transfer to these the germs of typhoid or other epidemic diseases from the places where it has bred or to which it has been attracted. On account of these facts, it is recommended that box privies should be abolished from every community, that the depositing of excrement in the open within town limits should be considered a punishable misdemeanour, and every breach of this law should be brought to the notice of the police, so that the nuisance may be removed. Boards of Health in all communities are urged to look after the proper

treatment of horse manure, so as to reduce to a minimum the number of house flies. Practical inferences to be drawn from this important investigation are that house flies, which occur everywhere and have a remarkable capacity for flying or being carried long distances in railway trains or other conveyances, are capable of carrying the germs of fatal diseases from place to place, and are therefore a source of great danger. In view of this, steps should be taken to restrict as much as possible their opportunities for breeding, by rendering their favourite habitats unsuitable for the purpose. To this end all such exposed matter in which they could breed should be removed or covered up as quickly as possible. Ashes, lime, or even dried earth, are usually easily obtainable, and will answer well for this last-mentioned purpose. Steps should be taken to prevent as much as possible the entry of flies into hospitals, houses, kitchens and pantries, by means of screens on doors and windows, and all flies found inside such protected buildings should be destroyed by a constant use of fly-papers or pyrethrum insect powder.

J. FLETCHER.

FOUR NEW SPECIES OF HIPPISCUS.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

Since the publication, in *Psyche* for 1892, of my study of the Orthopteran genus *Hippiscus*, a few additional species have come to light, and they are herewith described. The first species belongs to the subgenus *Hippiscus*, the others to the subgenus *Xanthippus*.

Hippiscus citrinus, sp. nov.—A compact and stout though rather small form. Head rather stout and full, broad above, luteo-testaceous, more or less infuscated above, dark fuscous in a stripe behind the eyes, the carinæ more or less infuscated; summit of head obscurely punctate, the vertical scutellum obscure and, with the foveolæ, much as in *H. compactus*; frontal costa broad, flat, punctate, depressed at the ocellus, where it is slightly enlarged, but otherwise subequal; antennæ ferruginous in basal, blackish in apical half. Pronotum stout, somewhat constricted mesially and considerably expanded on the metazona, the disc nearly plane with rather heavy rugæ forming the scutellum of the prozona, the metazona nearly smooth, but with a few slight rugæ and granulations; median carina very uniform and not prominent, but on the metazona slightly arcuate as seen laterally; lateral canthi tolerably distinct on the metazona (but rounded posteriorly), considerably surpassing the median

sulcus; process of metazona feebly obtusangulate. Tegmina blackish fuscous with a heavy testaceous sutural stripe, and crossed at middle and beyond by a narrow pallid stripe, and at end of basal third by a cinereous patch, the apical fifth vitreous, crossed by a couple of blackish fuscous stripes; wings pale citron at base, hyaline apically, the sutural line luteous, with a broad, blackish fuliginous mesial band curving broadly around the outer margin to the anal angle, and in the humeral area sending a narrowing tænia half way to the base; it leaves the four upper lobes free at the margin, but the two upper are clouded apically; the last forked branch of the discoidal vein arises at the outer edge of the mesial band; hind legs much as in *H. compactus*.

Length of body, 25 mm.; tegmina, 25 mm.

1 ♂. Alabama; C. F. Baker; No. 1912.

The species is separated from *H. compactus* Scudd., to which it is most nearly allied, by the markings of the tegmina (in which the darker parts are much more extended) and in the surface structure of the pronotal disc.

Hippiscus glaucipes, sp. nov.—Dark fuscous, sometimes more or less ferruginous, of slender form and small size. Head not very large, dull fuscous above, elsewhere pale fusco-cinereous, occasionally pale ferruginous, dotted with obscure fuscous, the summit feebly granulate behind the fastigium, which is distinct, with sharply defined but not greatly elevated walls, almost as broad as long, divided in anterior half by a median carina, open posteriorly; lateral foveolæ distinct, subtriangular, longer than broad, the inferior margin arcuate, the superior straight, embracing with their tips a median foveola of similar size and depth, its margins arcuate above, straight beneath when clearly distinguished from the frontal costa, as especially in the male; frontal costa moderately broad, subequal but slightly contracted at the summit and below the ocellus, somewhat sulcate throughout. Pronotum compressed, a little expanded on the metazona, especially in the female, nearly plane above, but the metazona feebly convex in the female, the process rectangulate, the median carina slight, equal, straight, uninterrupted between the sulci, the lateral canthi distinct but confined to the metazona, the dorsal surface, especially of metazona, marked with short, slightly obliquely longitudinal, distinct rugæ, the prozona with a slight scutellum, the lateral lobes with a broad, distinctly retroarcuate curve posteriorly. Tegmina dark fuscous, darkest in basal third and at the middle, with a distinct and generally

broad testaceous sutural stripe, a testaceous or pallid patch beyond the middle, a cinereous patch midway between it and the base, and the outer third mostly pellucid with fuscous veins and more or less flecked with fuscous; wings pale citron on basal half, except where the humeral vitta runs in nearly to the base, blackish fuliginous beyond except for a pallid sutural stripe almost invariably present, the apex of the two uppermost lobes often more or less vitreous, generally not so dark as the rest of the outer half of the wing, the dark portion following the outer border to the anal angle. Hind femora cinereo-testaceous, the inferior carina and sulcus luteous, but otherwise often twice obliquely striped rather narrowly with fuscous; hind tibiæ glaucous or iuteo-glaucous, the spines black-tipped.

Length of body, ♂ 19 mm., ♀ 28.5 mm.; tegmina, ♂ 20.5 mm., ♀ 25 mm.

5 ♂, 3 ♀. Yosemite Valley, Cal., Aug. 11; between Nevada Falls and Cloud's Rest, Yosemite Valley, Cal., Aug. 12; A. P. Morse.

This species is most nearly related to *H. obscurus* Scudd., differing from it chiefly by the structure of the surface of the pronotal disc, the less prominent median carina, the narrower tegmina, the presence of a sutural stripe on tegmina and wings, and the colour of the hind tibiæ.

Hippiscus validus, sp. nov.—Fusco-griseous, rather robust and somewhat below the medium size. Head rather large, more or less cinereous, rather broad and not very tumid above, the summit subrugulose, carinulate throughout; fastigium of vertex moderately deep, polygonal, with sharp but not very high walls, the frontal fastigium deeply impressed, constricted anteriorly, margined in front and behind as distinctly as at the sides; frontal costa moderately broad, strongly constricted above, slightly narrowed below the ocellus, somewhat sulcate or at least depressed at the ocellus; antennæ shorter than the head and pronotum, apically blunt and in no way attenuate in the female, castaneous, more or less infuscated apically. Pronotum expanding considerably on the metazona, which is nearly plane but rugulose, the anterior portion without signs of transverse plications, the process rectangulate with crenulate margin, the median carina slight, not altogether obliterated between the sulci, the lateral canthi sharp and distinct on the metazona, obscure or wanting on the prozona excepting on extreme front, the posterior margin of the lateral lobes vertical and not retroarcuate. Tegmina broad and rather short, but little surpassing the abdomen, griseo-cinereous, with

profuse irregular fuscous mottlings irregularly distributed, the anal line of the lighter colour, but sometimes obscure, the intercalary vein arcuate only at extreme apex, subequidistant throughout (and not very distant) from the median vein, the lower intercalary area broad and rather densely filled with anastomosing nervules, but not more densely than the area beneath it, the axillary vein united apically with the anal. Wings bright red (or occasionally citron?) at base, vitreous at apex, with heavily infuscated veins, and an extramesial, strongly arcuate, transverse fuscous band, about half as broad as the tegmina, tapering a little along the hinder margin, failing to reach the anal angle and leaving three marginal lobes free at the apex; it sends a stout humeral vitta to the very base. Hind femora cinereous, twice banded very obliquely and not very broadly with fuscous, very broad, the inferior carina rather high and rather strongly arcuate, the inferior sulcus red; hind tibiae red, paling basally, or luteous.

Length of body, 36 mm.; antennæ, 9 mm.; tegmina, 29 mm.; hind femora, 16 mm.

4 ♀. Blaine Co., Idaho, July 23; Mus. Leland Stanford Univ.

This species is closely related to *H. calthulus* (Sauss.), but differs from it in the sharper median carina and lateral canthi of the pronotum, the disc of which is less coarsely rugose; the transverse fuscous band of the hind wings is also narrower.

Hippiscus croceus, sp. nov.—Fusco-griseous, rather robust, and considerably below the medium size. Head moderate, pale cinereous excepting above, the summit gently tumid, transversely rugulose, feebly carinulate throughout; fastigium of vertex not deeply impressed, but with distinct walls, hexagonal, open behind, as broad as long, the front portion separated off by a low transverse ridge to form a divided frontal fastigium; frontal costa moderately broad, subequal, scarcely contracted either above or below the ocellus, moderately sulcate at and below the ocellus, punctate above; antennæ a little shorter than head and pronotum, apically blunt and scarcely attenuate on last two joints in the female, testaceous, apically infuscated. Pronotum expanding moderately on the metazona, the disc of which is faintly tumid with not very frequent short longitudinal rugæ throughout, the process rectangulate with rounded angle and subcrenulate margin, the prozona posteriorly impressed, transversely plicate, the median carina slight, percurrent, the lateral canthi distinct but not sharp, the posterior margin of the lateral lobes

vertical above, but faintly retroarcuate below. Tegmina broad and rather short, though surpassing considerably the abdomen, cinereous, thrice rather narrowly banded with clustered fuscous maculations, the apical third mostly obscurely hyaline, the intercalary vein straight, sub-equidistant between the median and ulnar veins, the lower intercalary area not very broad, similar in density of anastomosing veins to the area beneath it, the axillary vein free. Wings citron at base, vitreous at apex, with fuscous veins, crossed at and beyond the middle by a dark fusco-fuliginous band, as broad as the tegmina, including the hind margin and following it broadly to the anal angle; its outer margin on the spread wing is straight and a broad tænia in the humeral lobe runs almost to the base of the wing. Hind femora testaceous, thrice banded very obliquely and not very broadly with fuscous, broad, the inferior carina rather high and rather strongly arcuate, the inferior sulcus luteous; hind tibiæ luteous throughout.

Length of body, 25 mm.; antennæ, 9 mm.; tegmina, 27 mm.; hind femora, 14.5 mm.

2 ♀. Blaine Co., Idaho, July 23; Mus. Leland Stanford Univ.

This species belongs near the preceding species from the same district, and was collected on the same day. It differs in the sculpturing of the metazona and in the markings of the tegmina and wings. In the latter point it agrees fairly well with *H. montanus* (Thom.).

THE PROTECTIVE COLORATION AND ATTITUDE OF *LIBYTHEA CELTIS*, Esp., are described and figured in an article in a Russian magazine (Horæ Societatis Entomologicæ Rossicæ, Vol. XXXV., Nov., 1900), of which the writer gives the following English abstract: "The observations were made on the Southern coast of the Crimea. The butterfly in repose exactly resembles a dead leaf, just as many tropical Rhopalocera, with the famous *Killima* at their head. The circumstance that *Libythea celtis* makes use of its palpi and antennæ for the simulation of a stalk of a leaf is very singular, as no tropical 'leaf-shaped' butterfly does it. The coloration also completely conforms to the habits of the insect. The form of the folded wings, and the presence on the under side of the hind wings of a dark median vein, makes the resemblance to a leaf still more complete. We have thus in this species a unique example of a European butterfly which mimics the dead leaf as perfectly as several celebrated tropical species."—NICHOLAS KUSNEZOW, St. Petersburg.

[The photogravure plate shows three specimens of the butterfly in repose. The resemblance to a dead leaf is complete.]

ERRATUM.—On page 79, third line from bottom, read 1850, instead of 18—.

Mailed March 5th, 1901.

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The Canadian Entomologist

VOLUME XXXIII.

No. 4.

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APRIL, 1901.

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The Canadian Entomologist.

VOL. XXXIII.

LONDON, MAY, 1901.

No. 5

SOME RECENT WORK IN THE GENUS CATOCALA.

BY OTHO C. POLING, QUINCY, ILL.

Since the revision of this genus by the late Dr. Hulst, in 1884, contributions to our knowledge have not been extensive, while the material gathered in recent years has been very great. The popularity of the genus among students of Lepidoptera had made the necessity for a revision very keenly felt, so that when Prof. French generously undertook the work, a year or so ago, a feeling of gratitude was aroused by enthusiasts, who have known the thoroughness with which his work would be attended.

In offering him my assistance, I placed at his disposal a large number of Western forms, many of them from remote localities where no great amount of collecting in this genus had yet been done. I was not greatly surprised when my own opinion of some apparently new species was confirmed by that of Prof. French. Though reluctant about presenting these new forms until more material could be gathered for a more thorough study and comparison, I have consented to do so, since the assistance offered me by a more competent scholar has enabled me to bestow full credit for the work on Prof. French, who wrote the descriptions and modestly declined to "deprive me of the pleasure of naming my new forms."

Such sincerity is in marked contrast with some modern methods, where the object of contributing to our knowledge of science is lost sight of in the keen desire for personal prominence.

Catocala Frenchii, n. sp.

Expanse of male, 2.50 inches ; of female, 2.75 inches.

General or ground colour, pale glaucous gray, sprinkled over with black or dark brown atoms, so as to make the general aspect a pale blackish, rather than a brownish tinge, differing in that respect from *C. Californica*. Lines distinct ; basal line black, single, with a whitish

shading outside ; t. a. line black, double ; in the female the space between this and the basal line heavily shaded, with the inner part of the line broken on the subcostal and median veins, and the whitish shading reaching the basal line in the form of a triangle ; outer part of t. a. line much heavier than the inner, the enclosed space whitish, the line strongly dentate in two outer and two inner teeth, in this much like *C. Californica*, but the teeth sharper. T. p. line double, distinct, the two extra discal teeth nearly equal, inner part of line heavy, black, outer part brown, shading into the subterminal brown shade which is faint and indistinct ; s. t. line broken, also its white anterior shade, dentate, the outer dentations capping the white shade, the inner teeth mostly wanting in the line and faint in the white, towards the posterior angle the teeth form dashes with the intervenular lunules ; the lunules distinct ; the reniform brown, with a black annulus, situated in a blackish cloud ; subreniform white, more or less sprinkled with dark scales, pyriform with a point projecting towards base of wing from the upper inner part, closed, with the line connecting with the t. p. line sometimes indistinct ; preceding the reniform is a white or whitish space in the discal cell that reaches the t. a. line in a point ; it is whitish also outside or beyond the reniform to the t. p. line, though this is more indistinct than the white in the cell ; there is also a whitish space outside the t. p. line below the extra-discal teeth ; fringe gray, with a blackish line through the middle. Hind wings red, about the shade of *C. Californica*, slightly smoky at the base and the fringe of the inner margin ; median band nearly straight, of medium width, much like the band on *Californica*, slightly constricted in the middle, bent a little at posterior end, but not narrowed into a hook as in *Strechii*, ends abruptly about one-eighth inch before inner margin, without shade in either sex connecting with the margin ; marginal band wide, inner edge straight, to opposite end of median band, then with two prominent teeth, between which is a cavity reaching one-third the distance to outer edge ; apex white, slightly yellowish, but without red, the white space narrow, no other white outside the band ; fringe white, with a gray line that is not distinct throughout.

The thorax and abdomen as in allied species. The under side much as in *C. Californica* ; fore wings without tinge of red ; the s. t. white band quite narrow in its posterior third, a sharp but not long angle on submedian vein ; hind wings with inner two-thirds of light part red ; bands as above, but dentations of marginal band less distinct.

The above description is taken from two examples, one in collection of G. H. French, the other in the collection of O. C. Poling. They were taken at New Westminster, B. C., Canada.

This species belongs to the *Californica* group, resembling that species in size, and the bands of the hind wings; but it differs in having the ground colour more of a blue or glaucous gray, the markings more distinct, and a duller red to the hind wings, a deeper excavation in terminal band of hind wings near anal angle. The subreniform is nearly or quite separated from the t. p. line.

Catocala chiricahua, n. sp.

Expanse, 2.75 inches.

Colour gray, in places near the apex, and along the posterior margin, nearly as pale as the ground colour of *C. Robinsonii*; with a deep brown broken shade, not at first noticeable, extending from middle of base to apex, similar to that found in same examples of *C. innubens*, but a much brighter and deeper brown; all lines deep brownish black, prominent; basal line distinct, extending obliquely outward below the median vein to the submedian, and thence along this in a shade; t. a. line single, very broad on the costa, gradually narrowing to median vein, from which it extends to middle of posterior margin in about uniform width, with only one tooth pointing inward on internal vein, the line before the tooth a gradual curve with the convex side out; the space inside the t. a. line brown, except along posterior margin, the brown deeper in the centre, a small gray spot just outside the basal line below the median vein; t. p. line single, broad, shading inward somewhat, the extra-discal teeth extending well into the s. t. brown shade, subequal, the inflexion on submedian vein sharp, closed, extending almost to t. a. line; s. t. line nearly obsolete, as also its preceding whitish shade; terminal lunules scarcely more than dots; reniform brown, centre paler, a whitish annulus, with a median shade obliquely above the reniform, with the lower part of reniform in the edge of the central longitudinal shade that runs through the wing, the outer part with four more or less distinct teeth; subreniform prominent, rather wide open, white to the s. t. brown shade sprinkled with pale brown scales; scales of the s. t. brown shade and subreniform yellowish brown, those of the longitudinal shade mostly vandyke brown; in the cell and separated from it by its black annulus is an oblique white space or patch, not quite so large as the subreniform, that has a few brown scales, making with the subreniform an oblique whitish stripe from

near the subcostal vein to the s. t. brown shade ; the s. t. brown shade a little pale below the teeth of the t. p. line ; fringe gray, with a very little pale at the base.

Hind wings rich rosy crimson, about the colour of *violenta* and *Verilliana*, smoky at the base ; median band of medium width, wavy, almost broken by a sharp excavation on submedian vein, a few red scales between the line and the inner margin, where it ends a point of a triangle, the band is broad on the costa ; terminal band broad, inner edge slightly wavy, not excavate before anal angle ; apex very narrow, red ; a few red dots on edge of wing between the veins outside the terminal band, just before anal angle a narrow red patch with the fringe at this point also red ; elsewhere, fringe at apex white faintly rose tinted ; the rest of fringe black, with a little rosy white where the red dots are.

Under side with the black bands broad, the median of hind wings not reaching internal margin except by a faint shade ; the light bands of fore wings rosy, with white on the costa of the outer one ; posterior two-thirds of hind wings rosy red, the anterior part of outer band white with a rosy tint, the anterior part of base gray. Body as in allied species.

Described from one female from Southern Arizona, in the collection of O. C. Poling, Quincy, Ill. It stands between *aholibah*, Strecker, and *violenta*, Hy. Edw. The hind wings are more like *violenta*, of a brighter red than *aholibah*.

The shade of fore wings is much like that of *aholibah*, but brighter, and the s. t. brown shade much lighter. It is in general a much brighter insect than *aholibah*. It is much larger than *violenta*, and differs from *aholibah*, *violenta* and *Verilliana* in having a wide open subreniform.

Catocala fratercula, var. OUWAH., n. var.

This form, taken at Quincy, Ill., is between var. *gisela* and var. *Jacquetta*.

The general tint is brownish gray, the brown of the vandyke type instead of olivaceous ; pale gray in the cell before the reniform ; a deep brown longitudinal shade runs from the base to the apex, that is broken only by the subreniform being a little paler, the whitish shade preceding the s. t. line broken by this shade. It differs from *gisela* in the base along the posterior margin and the terminal margin not being pale, and in the central shade being more distinct. The hind wings resemble *gisela*, but the anterior part of the median band is wider than in *gisela*.

Described from one specimen in the collection of O. C. Poling.

Parthenos nubilis, var. APACHE, n. var.

Smaller and much paler than the northern form. Markings of fore wings do not differ from those of the typical form. Hind wings pale yellow. All bands much reduced. Heavy black marginal band of the northern form is only represented by a few black scales on the veins, while all the space between veins is yellow. Submarginal band indistinct, nearly disappearing before it reaches upper margin.

Easily distinguished at a glance from the northern form by the row of dots which replaces marginal band and other characters above mentioned. Types, seven examples in the collection of Dr. William Barnes, of Decatur, and that of the writer.

NEW NORTH AMERICAN ORTHOPTERA.

BY A. P. MORSE, WELLESLEY, MASS.

ODONTOXIPHIDIUM, gen. nov.—Allied to *Ziphidium*, from which it is probably derived. Distinguished from that genus by the form of the anal cerci of the male, which are elongate, straight, with the lateral tooth reduced in size, and an additional tooth upon the dorsal side near the base; and, in the type, by the form of the pronotum, which is sub-sellate and prolonged backward, covering the base of the abdomen both above and on the sides, in correlation with the absence of flight-organs. The type is *O. apterum*, described below.

Odontoxiphidium apterum, sp. nov.—Pronotum sub-sellate, the dorsum straight (♂) or slightly convex (♀) in longisection, smoothly convex in transection, the sutures nearly obsolete, the lateral canthi entirely lacking; posterior margin of lateral lobe nearly straight, passing into the posterior margin of hind process with a barely perceptible sinuosity at an angle of 45° with the dorsum when viewed from the side. Tegmina and wings absent in ♀, tegmina alone present in ♂, covered at base for one-third to one-half their length by the pronotum, the exposed portion one-half to two-thirds as long as the pronotum, vaulted, even the speculum convex, opaque, and abbreviated. Hind femora very stout, almost bulbous, at base. Cerci of ♂ straight, slender, evenly tapering, about as long as the last two segments on the dorsum, the usual lateral, inwardly directed tooth small, about two-thirds as long as apex of cercus and borne at base of distal third, the stem of the cercus (proximal two-thirds) elongate and bearing an additional, dorsally-directed denticle

about midway between the lateral tooth and the base. Supra-anal plate of the ♂ with the posterior process narrow, sub-quadrate, the apical angles rounded, the entire process usually strongly deflexed. Ovipositor straight, about five-sixths as long as the hind femora, acute and symmetrical at tip.

Body: ♂, 11-13; ♀, 11-18. Pron.: ♂, 3.5-4; ♀, 4.5-5.3. Teg.: ♂, 2-3. Post. fem.: ♂, 10-12; ♀, 13-15. Ant.: ♂, 45-60; ♀, 45-50. Ovip.: 10.5-12 mm.

Rusty or olivaceous above, the face and sides of body greenish. A well-marked brown, median dorsal band sometimes present, bordered on each side by a narrow pale line. Sides of abdomen of male sometimes more or less infuscated. Abdomen of young marked with a conspicuous, broad, median fuscous band.

Twelve ♂, fifteen ♀, two young, Aug. 15-Sept. 5, Hastings, Fla. (Brown); 1 ♀, Sandford, Fla., G. B. Frazer (Scudder).

Scudderia cuneata, sp. nov.—In dorsal view the anal segment of the male resembling that of *furcata* (see Scudder, Proc. A.A.A.S., 1898, fig. 8), but with the excavation at apex deeper, twice as deep as its middle width, the sides sub-parallel or slightly approximated distally from the middle, convergent to a very bluntly rounded apex at base of furcation; limbs of the furcula relatively slender, slightly approximate at tip, obliquely depressed. In lateral view similar to *Mexicana*, but with the furcula narrow and sub-acute at tip and the subapical flanges appearing as if truncate, the emargination reduced to a shallow excavation, the outline of the apex as a whole roughly cuneate. Sub-genital plate reaching tip of anal segment, strongly arcuate, rather slender.

Pronotum with parallel sides and distinct lateral canthi. Posterior femora spinulose, the spines three in number on outer, six on inner edge, very small, black. Tegmina long and narrow, apex rounded.

Body: ♂, 22. Post. fem.: 25. Teg.: 30x5.5. Wings pass teg.: 5. Ant.: 45 mm.

Green. Antennæ, tarsi and apices of tibiæ of anterior and middle legs, dorsal margin of tibia opposite sense organ, and lateral canthi of pronotum, rufo-flavescens, palest on pronotum, darkest on tarsi. Posterior tarsi and apical seven-eighths of tibiæ infuscated.

One ♂, Alabama (Baker).

Hesperotettix Floridensis, sp. nov.—Resembling *H. speciosus* (from which it is readily distinguished by the shorter tegmina), but rather

smaller, the pronotum more finely rugulose, the mid-carina less pronounced and nearly or quite obsolete on the prozona. Tegmina ovate, about two-thirds as long as wide. Furcula variable, consisting usually of a pair of minute rounded lobes nearly as wide and long as the width of last dorsal segment at their base, but sometimes obsolete. Cerci resembling those of *speciosus*, but more finely pointed, twice as long as their width at base, the basal three-fifths tapering evenly, the distal two-fifths equal, acutely pointed, straight or a little incurved. Female with both valves of the ovipositor slender, their ento-horizontal contours relatively straight, and both dorsal and ventral scoops elongate.

Body: ♂, 17.5-21; ♀, 24-30. Post. fem.: ♂, 11.5-13; ♀, 15-16. Teg.: ♂, 4.5-6; ♀, 5-7. Ant.: ♂, ♀, 8-10 mm.

Grass-green, yellowish beneath, with more or less rufous on the anterior faces of the anterior and middle femora and the dorsal carina of the external face of the posterior femora. Posterior tibiae bluish-green.

Fourteen ♂, four ♀, Aug. 15-28, Hastings, Fla. (Brown).

The following key may be added to that of Scudder—Rev. Melanopli, p. 57—under A¹:

- b¹. Tegmina elongate, two to five times as long as broad, roundly acuminate at tip. *H. speciosus*.
 b². Tegmina ovate, at most one and one-half times as long as wide. *H. floridensis*.

CANNIBALISM AMONG CATERPILLARS.

The following interesting notes upon this subject are taken from a paper recently received from Mr. L. de Nicéville, of Calcutta*:

"The larvæ of many kinds of butterflies will, when they cannot get vegetable food, eat each other or soft, newly-formed pupæ. Mr. Bell has found that the greatest cannibals in this respect are the larvæ of certain *Lycænidæ*, and the worst among these, again, are the larvæ of *Zesius chrysomallus*, Hübn., for these will at times, even when plentifully supplied with their proper vegetable food, eat any larvæ which may be in a fit state to be eaten; *i.e.*, which are either on the point of casting their skins, have just cast them, or are just going to pupate. The *Lycænid* larvæ, which

*"The Food-plants of the Butterflies of the Kanara District of the Bombay Presidency, with a revision of the Species of Butterflies there Occurring"; by Lionel de Nicéville, F. E. S., etc. Reprinted from the Journal, Asiatic Society of Bengal, Vol. LXIX., Part ij., No. 2, 1900, pp. 187-278.

are most addicted, after that of *Z. chrysomallus*, are those of the *Amblypodia* and *Tajuria* groups, those of *Arrhopala* and *Rapala* being nearly as bad. He has known one larva of *Tajuria cippus*, Fabr., to eat up over a dozen young ones of its own species. In Kashmir Mr. Bell bred a single imago of *Hysudra selira*, Moore, from a larva which had been reared on the dead leaves and flowers of its food-plant, *Indigofera atropurpurea*, Hamilt. (Natural Order Leguminosæ), together with several newly-formed pupæ of its own species. The imago was a very fine, large specimen, so that the insect diet evidently agreed with the larva. Mr. Bell particularly noticed this fact, as in all his previous experience he had been led to the conclusion that a cannibal diet was bad for the stomachs of the larvæ practising the habit of eating up their fellows, as they, as a general rule, have not been healthy, and have died before pupating.

"The tendency to cannibalism is not confined to the *Lycanidæ*, but exists also amongst the *Pierinæ*; the larvæ of *Appias* will eat each other and any other species of larva feeding on the same food-plant as themselves, if forced to it by hunger. He has seen the larvæ of *Appias libythea*, Fabr., and *A. taprobana*, Moore, eat freshly-formed pupæ of their own species, as well as larvæ changing their skins, and also the larvæ and pupæ of *Leptosia xiphia*, Fabr. Some of the caterpillars of the *Danainæ* will, when food is not to be had, eat individuals of their own species.

"Mr. Bell has never known a larva to eat another larva feeding on a food-plant of a species different from its own, so it is probable that all larvæ taste strongly of the plant they feed on, and it is also probable that cannibal larvæ are hardly conscious that they are eating up each other, being only guided to their proper food by the sense of taste, or possibly to a less extent by the sense of smell. None of the larvæ of the *Satyrinæ*, *Elymniinæ*, *Amathusiinæ*, *Acræinæ*, *Nymphalinaæ*, *Libythinæ*, *Nemeobiinæ*, *Papilioninæ** or *Hesperiidæ* have been found by Mr. Bell to eat anything but vegetable food. All rhopalocerous larvæ, however, with but very few exceptions, eat their own cast-off skins while these are still soft and moist; and the young larvæ on emerging from the egg will almost invariably, under normal conditions, make their first meal off the empty egg-shell. He notes that all the butterfly larvæ he has bred change their skins five times from the time they leave the egg to the time they turn to pupæ."

*The larvæ of *Papilio philenor*, Linn., whose food-plant is *Aristolochia siphia*, have been known to devour their comrades in captivity when supplies ran short. — Ed.

ON SOME BEES OF THE GENUS AUGOCHLORA.

BY E. S. G. TITUS, FORT COLLINS, COLO.

Augochlora Coloradensis, n. sp. (subg. *Augochlora*).

♀.—Green, often tinged with purple; face finely and confluent punctured above the base of the antennæ, more coarsely, confluent below, supraclypeal space sometimes not confluent punctured; clypeus with large punctures, black at tip; basal process of labrum subquadrate, broadly rounded, rufopiceous; mandibles black, rufous at tips; antennæ black, flagellum near the tip fulvotestaceous beneath; striation of the disc of the metathorax reaching to the summit, posterior truncation rounded above, lateral portions rounded, truncation not shining, rugosely punctured; tegulæ, often with a black dot in the centre, stigma and nervures testaceous; legs piceous, femora and tibiæ sometimes with a greenish cast, knees testaceous, tips of tarsi generally inclined to rufous; hind tibial spurs of posterior leg finely serrated; abdomen shining, polished, finely punctured; ventral segments black; *pubescence* of face, sides of thorax, tarsi partly, and abdomen, whitish; scutellum and first dorsal abdominal segments very fine and short, margins of segments fringed with white hairs; hair on tarsi often inclined to be rufous. Length, 6–7 mm.

♂.—Green; clypeus sometimes confluent punctured, slightly produced, anterior edge of clypeus and posterior portion of labrum white, labrum polished, testaceous anteriorly, slightly notched at tip; mandibles black at base, yellowish in middle and distinctly rufous at tips; antennæ black, flagellum, except last joint, yellowish testaceous beneath; thorax finely closely punctured, with the impressed lateral and central longitudinal lines smooth and distinct; striation of disc of metathorax as in female; posterior truncation distinctly bounded by carina; groove shallow; tegulæ, stigma and nervures testaceous, wings hyaline; legs green, knees testaceous, anterior tibiæ with the green restricted to a line posteriorly, two posterior pairs of tibiæ at the tips, and all the tarsi, darker toward tips, yellowish testaceous; abdomen shining, rather closely and finely punctured, apical portion of first segment somewhat constricted; ventral segments black, fourth widely emarginate; face, clypeus, cheeks, scutellum, legs and abdomen dorsally, sparsely clothed with whitish pubescence, ventral segments with fine short sparse white pubescence. Length, 5–6 mm.

Described from numerous females: Ft. Collins (5,000 ft.) and Boulder in May and June, Ft. Lupton (4,500 ft.) in July; and two males

on *Aster commutatus* at Ft. Collins, Colo., August 29. Females were taken on *Helianthus annuus* and *Malvastrum coccineum*.

A specimen from Ft. Lupton, Colo., has the second submarginal cells very narrow and also narrowed above; and one of the male specimens has the second submarginal cell in the left wing petiolate, the first and second transverse nervures being coalescent for one-third of their length above, the first recurrent nervure entering the second submarginal cell near the middle in both wings.

This species is closely related to *A. pura*, Say, *A. similis*, Robt., and *A. confusa*, Robt.; but seems to be easily separated from the descriptions of either of them. I have an *Augochlora* from Mr. E. P. Van Duzee, taken at Colden, N. Y., which answers to the description of *pura*, Say.

A. Coloradensis may be separated from *A. pura*, Say, by colour of thoracic pubescence, base of mandibles with no green spot, abdominal segments never margined with black; from *A. confusa*, Robt., by the less metallic tibiæ and tarsi; from *A. similis*, Robt., by the pure green colour, abdominal segments not at all testaceous. Although near *A. neglectula*, Ckll., it is a narrower species and also differs in colour and pubescence. I possess two specimens from Elmdale, Mich., that I believe are referable to *A. similis*, Robt.

Augochlora neglectula, Ckll. (subg. *Augochlora*).

A. neglectula, Ckll. Bull. 24, N. Mex. Agrl. Stat., Aug., 1897, p. 43.

Two female specimens: Ft. Collins, Oct. 17, and Greeley, Sept. 17. The former was taken on *Chrysopsis villosus*. This is a bluer species than *A. Coloradensis*, and the flagellum of the antennæ is uniformly paler. There are New Mexico specimens in our collection presented by Prof. Cockerell.

Augochlora humeralis, Patton (subg. *Augochloropsis*, Ckll.).

A. humeralis, Patton. Bull. U. S. Geog. Surv., 1879, p. 365, n. 39. Ashmead, Bull. 1, Colo. Biol. Assoc., 1890, p. 31.

This species has been recorded from the State, but I have seen no specimens from Colorado that I can refer to it. Specimens from Onago, Ks., (F. F. Crevecoeur) answer to Patton's descriptions. Mr. Ashmead very kindly examined specimens in the U. S. N. M. of *A. humeralis*, Patt., marked "N. W. Kans., Williston," and writes me that the hind spur of the hind tibiæ of the ♀ has but *three* spines.

Augochlora cleomis, n. sp. (sub. *Augochloropsis*, Ckll.). Fig. 6.

♀.—Blue-green; face above antennæ very finely confluent punctured, below antennæ more coarsely so; clypeus black at tip, punctures

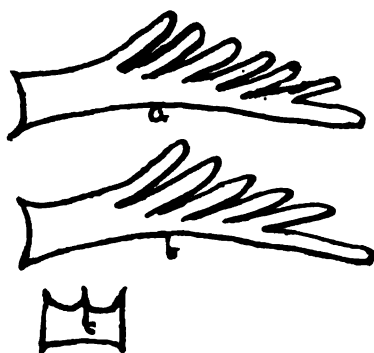


FIG. 6.—a Hind tibial spur of *A. cleomis*, female.
b Hind tibial spur of *A. carulea*, female.
c Fourth ventral segment of *A. cleomis*, male.

large and deep; labrum rufotestaceous; mandibles black with a green spot at base, rufous in middle and darker at tips; antennæ black, flagellum dark rufotestaceous beneath; prothoracic angles sharp, tubercles prominent; mesathorax very closely and finely punctured anteriorly, more sparsely so posteriorly; postscutellum with some larger separate punctures; metathoracic disc roughened, posterior truncation rounded above, distinctly punctured, lateral angles sharp, median groove shallow; tegulæ green, with a black spot shading into yellowish testaceous on the outer edges; wings hyaline, nervures and stigma yellowish testaceous, costal nervure of anterior wings very dark; anterior and middle femora and all the tibiæ blue green, posterior femora piceous, all the tarsi testaceous, hind tibial spur of hind legs with *six* spinous processes; all the tarsi, two posterior pairs of tibiæ and hind femora with dense pale pubescence; abdomen closely finely punctured, covered with short pale hairs, apical margins of first and second segments depressed slightly, fringed with short pubescence, ventral segments reflecting blue-green, densely pubescent; thorax, scutellum, postscutellum, behind tubercles, behind wings, and along the lateral sides of the posterior truncation with pale ochraceous pubescence, face clothed with short pale pubescence, cheeks with long white pubescence. Length, 8 mm.

♂.—Resembles the female; clypeus strongly produced, entirely green; labrum dark rufopiceous; flagellum testaceous beneath; tegulæ with more yellow than in female and with no black spot; mesothorax more closely punctured; legs green, tarsi yellow, testaceous at tips, legs with pale pubescence; abdomen shining, closely punctured, pubescence as in female, but the short pale pubescence of the segments is heaviest near the apical margins of the segments; fourth ventral segments so produced posteriorly in the middle as to form two deep curves on each side (see drawing). Length, 9 mm.

Described from a male (Aug. 19) and a female (July 17) taken on *Cleome serratula*, in Horsetooth Gulch, near Ft. Collins, at an altitude of over 7,000 ft.

This species differs from *A. humeralis*, Patt., as identified by specimens in the collection here, by the pale ochraceous pubescence, prothoracic margin not sinuous, posterior truncation not shining, median groove shallow, legs blue-green, not black beneath, hind tibial spur of female; colour of tegulæ; and first three ventral segments being green. The male most resembles *A. fervidus*, Smith, but that is described as having long white hair on the legs, and tarsi pale testaceous with yellow hair.

Augochlora cærulea, Ashm. (subg. *Augochloropsis*, Kll.).

Agapostemon cæruleus, Ashmead. Bull. 1, Col. Biol. Assoc., 1890, p. 7.

♂.—Entirely blue; pubescence rather dense, short, appressed, whitish, denser on face, and on apices of first and second abdominal segments, where it is longer and forms yellowish ochraceous hair-bands; face and occiput, excepting clypeus and supraclypeal space, very closely densely punctured; clypeus with elongate shallow separate punctures, and slightly produced, hardly truncate at tip, shining; supraclypeal space with round separate punctures; face and cheeks with rather long dense white hairs; mandibles with a green spot at base, rufous in middle and with darker tips; only the scape and three joints of the flagellum remain; the original description reads: "Antennæ ferruginous, blackish above." Prothoracic angles sharp, more prolonged than in *A. cleomis*, joining the prominent green tubercles by a curved line, which is fringed with short hairs; mesothorax finely closely punctured; scutellum with fine punctures, not very close in centre; postscutellum finely confluent punctured; disc of metathorax shining, green, punctured, lateral angles sharp, base of

metathorax very finely punctured except around the posterior edge and sides, where the punctures are *very few* and scattered; sides of metathorax finely confluent punctured, base distinctly enclosed; thorax on sides and beneath, scutellum, behind tubercles, with medium ochraceous hairs; tegulæ deep blue-green, smooth in centre; wings hyaline, nervures and stigma testaceous; legs blue-green, tarsi yellowish testaceous, darker at tips; anterior and middle legs fringed with pale pubescence, becoming somewhat rufous near the tips of the tarsi; posterior legs wanting; abdomen dorsally, purple, finely closely punctured, entirely covered with short pale hairs, four apical segments more densely pubescent; fourth ventral segment as in *A. cleomis*, but the curvatures are not nearly so deep; first, second and third ventral segments densely, closely punctured, violet blue, posterior margin of second and third with a triangular space in the centre, extended narrowly along the sides, smooth and testaceous, remaining segments black, venter with very short hair. Length, 11 mm.

♀.—Resembles the male closely; pubescence dense on sides of face, cheeks, beneath, and clypeus, behind wings, on scutellum and pleura, quite dense; thorax closely, finely, partly confluent punctured, pleura more coarsely so; metathorax with a faint trace of triangle, truncation shining, punctured; tegulæ green with an impunctate wide outer margin; legs green, femora darker beneath, tarsi and tibiæ piceous, inclined to ferruginous at tips; anterior and posterior legs and middle tarsi with dense pale pubescence; hind spur of hind tibiæ pectinate with *five* pointed spines; venter piceous, with a decided bluish tinge, margins of segments testaceous, fringed with hair. Length, 10 mm.

Male taken at Denver, Colorado, by Mr. Horace G. Smith, and is in Mr. Ashmead's collection. Through the kindness of Mr. Ashmead, I have had the type specimen to examine. The female was taken at Ft. Lupton, Colo., (R. Haynes) and is now first described.

I wish to express my thanks to Prof. Cockerell and Mr. Wm. H. Ashmead for the many favours I have received from them during the preparation of this article.

On October 30th, 1900, at 8.25 a. m., I watched the emergence of a male *Vanessa antiopa* from its chrysalis. The temperature was 51°, with a stiff breeze blowing. The chrysalis was under the ledge of a fence and had been exposed to several degrees of frost. Several of the same species emerged during the previous week. A. E. NORRIS, Montreal.

THREE NEW PARASITIC HYMENOPTERA FROM SOUTH AFRICA.

BY WILLIAM H. ASHMEAD, ASSISTANT CURATOR, DIVISION OF INSECTS,
U. S. NATIONAL MUSEUM.

Prof. Charles P. Loundsbury, Government Entomologist, of Cape Town, South Africa, has recently sent to Dr. L. O. Howard, U. S. Entomologist, a lot of bred parasitic Hymenoptera for names, among which were found three new species, which, at the request of Dr. Howard, are characterized below :

Family LVII.—PLATYGASTERIDÆ.

Genus *Allotropa*, Förster.(1) *Allotropa Loundsburyi*, new species.

♀.—Length, 0.9 mm. Polished black ; antennæ and legs mostly brown or brown-black, the base of the scape, pedicel, funicle joints 1 to 4, trochanters, knees, base of tibiæ, the tarsi except last joint, and the petiole of abdomen, yellow. Wings hyaline, entirely veinless, except the subcostal vein which terminates in a small knob.

The antennæ are 8- or 9-jointed, depending upon whether the enlarged antepenultimate joint is counted as a single joint or as two closely-united joints ; funicle joints 1 to 4 much slenderer than the pedicel or joints 5 and 6 of funicle, the first joint being not quite twice as long as thick, the second shorter, the first and fourth subequal, subquadrate. The abdomen elongate, conically pointed, about one-third longer than the head and thorax united, the petiole very short, wider than long, while the second segment is large and occupies about half of the whole surface of the abdomen.

♂.—Length, about 0.8 mm. Agrees well in colour with the female, but differs in having the antennæ distinctly 9-jointed, the joints being distinctly separated, the flagellum filiform, the joints oblong, with whorls of sparse long hairs, while the abdomen is oblong oval, not pointed at apex and not longer than the thorax.

Type.—Cat. No. 5727, U. S. N. M.

Hab.—Cape Colony, South Africa.

Host.—Rhynch. : *Dactylopius* sp. on Gorse.

Bred by Prof. Chas. P. Loundsbury, Oct. 22, 1898.

The Platygasterids, so far as we know, are parasitic only upon Dipterous insects, and probably this species will be found to be a hyperparasite upon a Dipteran infesting the scale insect.

Family LXVII.—ENCYRTIDÆ.

Genus Coccidencyrtus, Ashmead.

(2) *Coccidencyrtus flavus*, new species.

♀.—Length, 0.8 mm. Golden yellow; legs yellowish white; antennal club brown; eyes brown-black. Wings hyaline, the marginal vein punctiform, not longer than thick, the postmarginal scarcely longer than the radius or stigmal vein; the stigmal vein, although comparatively short, is fully twice as long as the punctiform marginal vein and terminates in a little knob.

The flagellum is subclavate, the funicle 6-jointed, the joints submoniliform, increasing in width and size to the club, the first three or four joints being very small, narrower than the pedicel, the sixth about as wide as the pedicel, the club stouter, cone-shaped and as long as, or a little longer than, funicle joints 3 to 6 united.

Type.—Cat. No. 5728, U. S. N. M.

Hab.—Cape Colony, South Africa.

Host.—Rhynch.: *Dactylopius* sp. on Gorse. (Chas P. Loundsbury.)

Evidently the same thing, only slightly differently coloured, being more of a brownish yellow, having the sutures of the thoracic sclerites, a spot on the anterior part of the thorax and a band across the base of the abdomen, dark brown, but otherwise agreeing structurally; was bred by Prof. Loundsbury from a *Lichtensia* sp. on Pittosporum.

Family LXXI.—EULOPHIDÆ.

(3) *Tetrastichus prospalta*, new species.

♀.—Length, 0.7 mm. Black (possibly polished, the specimens being mounted on a slide in balsam, and the sculpture, if any, not being noticeable); face anteriorly and the legs, except the hind femora, apparently pale yellow; hind femora brown. Wings hyaline, the tegulæ and veins pale yellowish; the front wings, from base to the origin of the marginal vein, are wholly hairless, beyond they are closely, finely hairy and ciliate at margins; the marginal vein is very slightly longer than the subcostal, while the stigmal vein is much less than its length.

Type.—Cat. No. 5729, U. S. N. M.

Hab.—Outspoon, South Africa.

Host.—Hym. : *Prospalta aurantii*, How., infesting a *Mytilaspis* sp. on *Salix Capensis*.

THE LIFE-HISTORY OF THE GREENHOUSE LEAF-TYER.

(*Phlyctænia ferrugalis*, Hbn., = *Botis Harveyana*, Grt.)

BY DR. JAMES FLETCHER AND ARTHUR GIBSON, OTTAWA.

The larvæ of *Phlyctænia ferrugalis*, Hbn., have been since 1897 the cause of some loss to roses in the large houses of Mr J. H. Dunlop, Toronto. References to this occurrence will be found in the Reports of the Entomologist and Botanist to the Dominion Experimental Farms for 1899 and 1900.

On the 12th November, 1900, a visit was paid to the above houses by Mr. Gibson, and specimens of the mature larvæ found feeding both on violets and chrysanthemums were secured, as also some larvæ in other stages of development. These all changed to pupæ, and in due course the moths appeared, the pupal state lasting from 17 to 20 days.

On the 4th December six moths, which had just emerged (the whole six within three days), were placed in a muslin bag over a violet plant. On the 7th December a large number of fresh eggs were noticed. They were laid on the under side of the leaves, sometimes singly, in pairs, in rows of 3 or 4, or in clusters of from 3 to 7, placed close together and overlapping at the edges.

The following notes, describing the egg and larval stages, were made:

Egg.—0.5 mm. in width, round in outline, much flattened, slightly raised in centre, pearly white, coarsely reticulated, and, from their flattened appearance, remarkably like those of the Codling Moth. Before hatching, the black heads of the young larvæ are very apparent through the shell.

The eggs which were laid on the 7th December hatched in a warm office on the 21st December, making the duration of the egg state 14 days.

Stage I.—Length, 2 mm. General appearance, semi-translucent creamy-white larvæ, body bearing long whitish hairs. Head 0.2 mm. wide, rather flattened, horizontal, inclined to be wedge-shaped, large, deep black, shining, and bearing slender whitish hairs. Mouth-parts pale brownish. Tubercles on segments piliferous and faintly darker than body,

the hairs whitish and slender. Skin of body smooth and shining. Thoracic feet and prolegs concolorous with body, all bearing short whitish hairs. After feeding, the colour of the green food contents gives the young larvæ a light greenish appearance.

The young larvæ feed on the under side of the leaves, and eat little holes into the soft tissue. When at rest they curl the head and front segments around to the side of the body, and if disturbed, fall and hang suspended on silken threads. When settled on a leaf, the young larva spins a few threads of delicate silk, from one portion of the leaf to another, feeding and living inside this slight, almost transparent enclosure.

On the 28th December one larva passed the first moult. Before moulting (a day or so), its colour changed, becoming very pallid. On the 29th December two more larvæ passed the first moult, and by the morning of the 31st December, eleven specimens had moulted.

Stage II.—Length, 2.5 mm. General appearance, shiny, semi-translucent, creamy larvæ, with a greenish tint, some specimens whitish; after feeding, dorsal surface distinctly green; body bearing long whitish hairs. Head 0.27 mm. wide, indented at vertex, rather flattened and horizontal, and shaped as before, shining, blackish-brown, in some specimens light brownish mottled with darker spots, margins of clypeus distinctly darkened, ocelli black, mouth-parts brownish, the face bearing slender light hairs. Body cylindrical, tapering slightly towards extremities, segments deeply divided, skin smooth and shining. Green dorsal vessel distinct, on either side of which are two very faint bands. Tubercles piliferous, larger and more noticeable than in last stage, the hairs long and slender. On segment 2 are two distinct black spots, one on each side, at margin of dorsal area. The thoracic feet and prolegs are concolorous with ventral surface of body, and bear slender pale hairs.

On the 7th January two larvæ were swollen and the next day they passed the second moult. Other specimens moulted on the 9th and 10th January.

In this moult, as in the previous one, the cast skin and head remain united, and look as if the larva had simply shrunk and dried up.

Stage III.—Length, 3.5 mm. General appearance, shiny, semi-translucent, pale green larvæ, with a green dorsal vessel and faint stripes down the back, the body bearing slender whitish hairs. Head 0.4 mm. wide, shaped as before, deeply indented at vertex, slight furrow between cheeks, pale brownish-yellow, rather translucent, mottled with brown

blotches, some specimens almost wholly light brown with darker blotches; margins of clypeus darkened in some specimens, ocelli black, mouth-parts brownish, in some examples light reddish, antennæ pale, darkened at tips, hairs on face white, long and slender. Body shaped as before: after feeding, dark green dorsally, pale ventrally. Piliferous warts large, but rather indistinct, hairs white, long and slender, skin smooth and shining. Dorsal vessel dark green, distinct, bordered on each side with two white bands. On segment 2 are the two distinct black spots as before. Spiracles are very small and faint, and are joined by an almost imperceptible white, hair-like line. Thoracic feet and prolegs concolorous with ventral surface of body, all bearing slender pale hairs.

On the 14th January three specimens were slightly swollen, and by the morning of the 15th had passed the third moult.

Stage IV.—Length, 6 mm. The general appearance of the larvæ in this stage is the same as in stage III. Head 0.67 mm. wide, small, not quite as large as segment 2, shaped as before, deeply indented at vertex, slight furrow between cheeks, honey colour, with pale brownish blotches, margins of clypeus not so distinctly darkened as before, but slightly furrowed at sides, mouth-parts pale reddish, antennæ honey colour, darkened towards tips, ocelli black. On lower side of cheek, close to posterior margin, in line with ocelli, there is a distinct black spot. The whole face bears slender pale hairs. Body tapers slightly towards extremities, as before; piliferous warts concolorous with body, each bearing a single long, slender, whitish hair. Dorsal area dark green, sides and venter pale green. On segment 2 the two black spots are the same as before, but now appear as if in a small rounded cavity. Behind each of these large spots, almost touching them, is a very small black dot. Segments deeply divided. The dorsal vessel and the double sub-dorsal band are very distinct in this stage. In some specimens the green space between the two bands bordering each side of dorsal vessel is suffused slightly with white. Spiracles whitish, joined by a distinct, slightly wavy, white line. Thoracic feet and prolegs concolorous with venter, all bearing a few slender hairs. The thoracic feet have each two blackish dashes exteriorly. The anal prolegs are extended, giving a bifurcate appearance to the anal segment.

During stage IV. the larvæ increased rapidly in size, and consumed much food, and also spun considerable quantities of silk.

On the 19th January one larva passed the fourth moult, and others on the 21st and 22nd January.

Stage V.—The general appearance of the larvæ in this stage is the same as in the last two stages. Length at rest, 11 mm. Head 1.0 to 1.1 mm. wide, large, about the same width as segment 2, shaped as before, deeply indented at vertex, and slightly furrowed between cheeks, pale honey colour, splashed with light brownish angulated blotches, which are larger than in stage IV., and mostly on cheeks. Mouth-parts pale reddish brown, antennæ pale, darkened at tips, ocelli black. The distinct black spot on the lower side of cheek, near posterior margin, is not now present, but close to where it was is a large elongated brownish blotch. Hairs on face and around mouth-parts pale and slender. Shape and colour of body as before; segments not so deeply divided as in last stage. The two large black spots on segment 2 are as before, as are also the two small black spots, observed in last stage, close behind these. In some specimens these latter spots are hardly visible, and in a few larvæ the large spots appear as if simply expanded slightly posteriorly. The piliferous warts resemble small swellings, and, being concolorous with body, are indistinct, unless examined with a lens. The large lateral warts on segment 2, just above the thoracic feet, bear a few brownish blotches. The dorsal vessel, the double sub-dorsal band, and the slightly wavy line joining the spiracles, are as before, but are faint on segments 2, 3, 12 and 13. The spiracles are small and whitish, slightly darkened at edge. The thoracic feet are concolorous with ventral surface of body, and bear two blackish-brown dashes exteriorly, prolegs pale; all the feet bear slender hairs. Anal prolegs divergent. Position of tubercles normal, except that ii is almost exactly in a line posterior to i.

When mature, the larvæ at rest measure 15 mm. long, and when extended, 18 mm.

On the 29th January one larva folded a leaf over, preparatory to changing to pupa. On the 30th January the folded portion was sealed, and by the 1st February the larva had changed to pupa. Another which began to spin its cocoon on the 30th January had changed to pupa by the 2nd February. In the remaining specimens the period covering the change of the larvæ to pupæ agreed with the above two.

When forming its cocoon, the larva simply folds over a portion of a leaf, and fastens it with threads of fine white silk, or choosing a central portion of a leaf, draws down another leaf to serve as a covering, and

then changes to pupa. The cocoon itself is very slight, and is merely a web or covering of slender threads of white silk.

Pupa.—Length, 8.75 mm.; width at widest part, 2 mm. The wing-cases and thorax are shiny black, lightly chased with vermiform lines. The abdomen is dull black, and finely shagreened, the segments transversely wrinkled on dorsum; the folds between the segments are ochraceous. On the thorax are 10 rather long, stiff, blunt, rust-red bristles, curving forward, 5 on each side, and along the dorsum are 2 series of conspicuous black warts, 1 on each side, each bearing a single, long, rusty, twisted hair, which first slopes forward and then swings towards the centre of dorsum, and backwards for $\frac{3}{4}$ of its length. The spiracles are black, and just above them is a row of small, black, piliferous warts, each with a single, thin, short hair. The cremaster is prominent, of a dull red colour, edged with black, and terminates in a bunch of 8 rust-red bristles, 4 on each side, which converge and cross at their tips, forming an arch. In one specimen the two posterior segments were the same colour as the cremaster.

The length of the pupal state of these specimens was the same as that of those moths bred from mature larvæ in, and previous to, November, 1900, viz., 17 to 20 days.

TWO NEW SPECIES OF PULVINARIA.

BY GEORGE B. KING, LAWRENCE, MASS.

Pulvinaria Hunteri, n. sp.—Old, dried and wrinkled female scales, cream-colour, more or less mottled with patches of red-brown, and the outer margin practically red-brown. Ovisac clear white, texture as in *innumabilis*, and not so large. The size of the scale, cleared and spread under cover glass, practically hemispherical, is from 6 to 7 mm. in diameter. The texture of the scale is quite thin and requires little boiling in caustic potash to make it very clear and colourless. The following measurements of antennal segments are in micromillimetres:

1	2	3	4	5	6	7	8	
40	48	64	48	20	24	20	36	} On maple.
40	40	60	52	20	20	20	36	
40	40	60	48	28	20	20	44	} On honey locust.
40	40	68	52	28	24	24	44	

Joint 3 is longest, 4 next; there is little difference in the length of 1, 2 and 8, and 5, 6 and 7 are nearly equal in length. The first joint has 3

hairs, two short and spine-like and one very long ; the second has 3, two short and one long ; the third has 1 long hair ; the fifth, 3 ; the seventh, 2 ; and the eighth, 10 ; all of medium length. Legs ordinary, with the coxa, 140 ; width coxa, 88. Femur with trochanter, 192 ; width trochanter, 60. Tibia, 160 ; width, 28. Tarsus, 80 ; width, 24. Claw, 28. Spines of the lateral clefts in threes, one very long, not stout, 88 long ; two short and small, 28 long. The large marginal spines are practically the same as those of *innumerabilis*, 36 and 40 long, but in the short, spine-like hairs of the margin they differ in being placed behind the large spines, whereas in *innumerabilis* they are in front.

Hab.—On maple at Kansas City, Kansas, (C. H. Swobode,) Col. auct., at Lawrence ; Kansas, on honey locust, Col. S. J. Hunter, after whom I have the pleasure of naming this species, for the good work he has done in the publication of his studies in the *Coccidæ* of Kansas.

Pulvinaria Hunteri is evidently a native species and very distinct from any hitherto found in America.

Pulvinaria Ehrhorni, n. sp.—♀ scales dark brown. Ovisac clear white, texture as in *innumerabilis*, and smaller. The shape of the scales under cover glass is practically round, although some of the smaller individuals are somewhat pyriform in shape, 4 and $5\frac{1}{2}$ mm. in diameter. After prolonged boiling in caustic potash, the derm is strongly stained with brown ; texture tough and thick. Gland pits numerous, of two sizes. Margin spines thin, sharp and inclined to be curved at their end, those of the area at the posterior cleft longest, 44 long, while those anteriorly are only 24 long. Spines of the lateral incisions in threes, one long and stout, 68 in length ; two short and stout, 36 long. Anal plates, heart-shaped ; each plate with three small spines at tip, and three larger bristles on the outer margin. Front leg : Coxa, 120 ; femur, with trochanter, 220 ; tibia, 128 ; tarsus, 88 ; claw, 28 long. Width : Coxa, 120 ; trochanter, 64 ; tibia, 32 ; tarsus, 24 ; with one long stout bristle on the coxa, and one on the femur, with two shorter ones on the trochanter. Antennæ, 8-jointed : 3 longest, 4 and 5 next, and in some individuals nearly equal ; 1 is next, then 8, 6 and 7 are shortest and nearly equal. The first joint has one long and one short hair ; the second, two long ; the third, one ; the fifth, two ; the sixth, one ; the seventh, two ; and the eighth, nine ;

these all stout, with one very long. The measurements of the several joints are as follows :

Joint—1	2	3	4	5	6	7	8
52	48	92	60	60-48	28	28	40
52	40	80	56	52	24	24	40
48	40	80	52	60	36	32	44

The approximate formula will be 345128(67). There are a number of long, thin hairs between the antennæ, very variable in length, 136, 80, 56 and 40. There are also some short, spine-like hairs.

Hab.—At Mountain View, California, on alder and willow ; found May 3rd, 1899, by Mr. Edw. H. Ehrhorn. It is a very distinct species and can be separated easily from its nearest American ally, *Pulvinaria occidentalis*, by the antennæ. I take pleasure in naming this insect after Mr. Ehrhorn, in recognition of the fact of his good work done in the discovery and technical study of the Coccids of California. So far as known at the present time, this makes the fifteenth species native to the United States ; and *P. Hunteri* is the fourth species found to infest maple.

I take this opportunity to record the finding of *Dactylopius Kingii*, var. *Neo-Mexicana*, Tinsley, in nests of *Lasius Americanus*, Em., at East Las Vegas, New Mexico, by Prof. Cockerell, and also *Ripersia flaveola*, Ckll., at Gullinas Canon, New Mexico, by Prof. Cockerell and Mrs. Wilmatte Cockerell, under a log in the transition zone, altitude about 7,500 feet. The same species was found by Mrs. E. L. Hewett and Mr. Cockerell at East Las Vegas, N. M., in the nest of *Lasius*, sp. Hitherto this species was only known from Massachusetts, from ants' nests.—G.B.K.

TYPES AND SYNONYMY.

BY JOHN B. SMITH, SC. D., RUTGERS COLLEGE, N. J.

Two papers in the last (April) number of the CANADIAN ENTOMOLOGIST are of great interest to me, and both on the same general topic applied to very different species. Mr. Lyman makes an earnest effort to save Mr. Walker's name *Spilosoma congrua*, and gives all the facts relating to the name, its publication and subsequent history ; upon which facts Mr. Lyman and Sir George Hampson reach opposite conclusions. I have no liking for Mr. Walker's species, but I think I would side with Mr.

Lyman in this case, because, with all the examples before them, Messrs. Grote and Robinson separated out a good species with which a specimen of another, previously known, was erroneously associated. By removing one example, a good species remained, to which the name given by the author could be correctly applied.

All of us are apt to err in associating examples, and I have always made it a rule to hold a name if I can do it. So I think Mr. Lyman correct in this case on his statement of facts, though I had reached a different conclusion from a somewhat different combination of real and supposed facts.

On page 122, Dr. Harrison G. Dyar, Washington, D. C., assistant in charge of the Lepidoptera in the U. S. National Museum, has some remarks on certain species of *Acronycta* which are suggestive indeed.

First, he accepts my identification of *impleta* with *luteicoma* in so grudging a spirit that he suggests destroying the type—of *impleta*, I presume—"lest future changes in the synonymy result." It is to be assumed that Dr. Dyar wishes to be taken seriously, and in view of the fact that there are several hundred types in his charge, the suggestion is unpleasant reading. It is a somewhat startling method of securing stability of nomenclature!

Without disputing the facts as I stated them, that the type of *brumosa*, Gn., directly compared with that of *persuasa*, Harv., proves them to be identical, he yet proposes to retain *persuasa*, Harv., but to apply the name *brumosa* to what we have heretofore considered *hamamelis*. In other words, he desires to apply the name to a totally different species from that which was in the hands of its describer. That Guenée mixed up matters in attempting to associate Abbott's drawings of larvæ with the imagoes, is undoubtedly true, but it was the moth that was described and named, not the larva.

I am perfectly aware that a species is entirely represented only by all its stages and both sexes of the adults; but it is nevertheless true that it is the adult form that receives the name, and when we have the adult to which the name is applied, we have assumed that we had the court of ultimate resort by which the validity of the species must be tested. If we could set that adult aside because the description does not quite fit it, or because of an error in associating an earlier stage with the type, we might just as well abandon the effort to fix a type. And why should the U. S. National Museum desire types under such circumstances? If

its official representative refuses to recognize the application of type labels to the specimens with which they are associated in the British Museum, why should anyone else give greater credit to similar labels in the U. S. National Museum?

Dr. Dyar is not even consistent: it rather suits him to restore the term *clarescens* to the form which Mr. Grote originally and correctly so identified, though the description applies so much better to *haesitata* that I felt myself entirely safe in following Mr. Butler's reference of the name to the latter species. But because *hamamelis*, as applied to the form afterwards named *afflicta* by Mr. Grote, does not agree with his preferences, he suggests its application to what Mr. Grote named *subochrea*, because the description better suits that form.

The question narrows itself to this: Which is the court of final resort, the type specimen which the author named and intended to describe, or the description which, if it does not apply to the specimen it was made for, may apply to nothing at all?

In reference to the *var. b* of *brumosa*, Dr. Dyar is correct in saying it is not described; but Guenée evidently received additional information and perhaps specimens after writing the original description, for he refers again to the species on p. 390 of the 3rd volume of the *Noctuelites*, without adding to or changing the characterization of the adult.

Mr. Walker is not particularly good authority, but it is an indication at least that he suggested *brumosa* and *hamamelis* as sexes of one species; and Mr. Walker was not famous as a lumpers either. Assuming my suggestions as to synonymy to be correct, Walker's remark is not so far out, especially when that *var. "b"* is considered; but assuming Dr. Dyar to be correct, the suggestion becomes ridiculous, because Walker, ever on the lookout for differences, simply could not have considered *hamamelis*, Auct. (not Gn.), as the same as *subochrea*. The bare fact is that the specimen which in the British Museum is marked as the type of *hamamelis*, Gn., is that form which Mr. Grote afterward called *afflicta*, and that the form to which Dr. Dyar now wishes to apply the name *brumosa* was apparently not in Guenée's hands at all!

The twentieth annual meeting of the Royal Society of Canada will be held at Ottawa, beginning on Tuesday, May 21st, under the Presidency of Mr. Louis Frechette, C. M. G., LL. D.

THE AMERICAN BEES OF THE GENUS ANDRENA DESCRIBED BY F. SMITH.

BY REV. F. D. MORICE AND T. D. A. COCKERELL.

(Continued from page 124.)

Andrena fragilis, Smith, 1853.

"This I suspect is the ♂ of *integra*; area similarly strigose, and abdomen also corresponds; tubercle matches also!"

Robertson thought this might be *A. platyparia*: but, he said, the description applied even better to *salicis*, and nearly as well to *mandibularis*. It cannot well be *salicis*, as that has the abdomen impunctate; if it is the ♂ of *integra*, it cannot well be *mandibularis*; it may perhaps be *platyparia*.

Andrena frigida, Smith, 1853.

"(Very near *apicata*, but hairs of thorax much darker) ? = *lapponica*; antennæ with very long third joint; tubercle \cap ; area granulated; abdomen in style of *apicata*."

Type locality, Nova Scotia. I do not know any similar species.

Andrena fimbriata, Smith, 1853 (*Americana*, D. T.).

"♂ abdomen rugulose and punctured, clothed with long adpressed hairs; tubercle slightly emarginate (?); area dull granulose; ♀ ditto. (Very near *fuscipes*, perhaps identical with it.)" This agrees with what I had already identified from Smith's description. It seems to agree with the description of *A. simillima*, Sm., even better than with that of *fuscipes*, but I doubt its actual identity with either.

Andrena hirticeps, Smith, 1853.

♂. "Tubercle pointed apparently, hard to see under thick bush of hair on clypeus; area obliquely rugose at base only, no raised margin; abdomen tessellate, practically impunctate; apical ventral valve somewhat bilobed; antennæ with article 3 = 4 + 5 about, all joints pretty long. Has a good deal the aspect of *gwynana*." This was considered the ♂ of *A. vicina*, but Robertson (1900) has come to regard it as a valid species. He further adds: "But for the description of the ♂, I would say that *A. errans* is the same as *A. hirticeps*." I have an Illinois "*hirticeps*," ♂, from Mr. Robertson, and the abdomen is distinctly punctate at the bases of the hairs, while the third antennal joint is barely longer than the fifth, the fourth being a little shorter than either. The apical ventral

valve also is not bilobed. In the female of Robertson's "*hirticeps*," the basal process of labrum is low, broad and rounded (semi-circular, Robertson expresses it), which does not agree with *vicina* or *errans*. Robertson's insect will therefore need a new name, as follows:

Andrena Carlini, n. n., Ckll.

Andrena bicolor (not of Fab.), Rob., Tr. Am. Ent. Soc., XVIII., 51.

Andrena vicina (not of Sm.), Rob., Tr. Am. Ent. Soc., XXII., 118.

Andrena hirticeps (not of Sm.), Rob., Trans. Acad. Sci., St. Louis, X., 47.

The true *A. hirticeps* is a northern species, from Hudson's Bay.

A. Carlini is from Illinois; type locality, Carlinville. It also occurs in Kansas, N. Y. and N. M. (see below).

Andrena algida, Smith, 1853.

- ♂. "Tubercle truncate; apical ventral valve \cap ; antennal joint 3 about = 5, slightly longer than 4; area (longitudinally) somewhat rugose; abdomen tessellate and also delicately punctured." Type locality, Hudson's Bay. The ♂ is rather suggestive of *Carlini*, except as to the tubercle.

The ♀ described by Smith is not at all like *Carlini*.

Andrena nubecula, Smith, 1853.

- ♀. "Tubercle emarginate; area shortly rugose at base; abdomen tessellated, impunctate; a pretty insect, with broad white bands and pale reddish-yellow apex; antennal article 3 scarcely = 4 + 5 (cf. *proxima* or *dorsata*)." "Wings remarkably clouded."

I have this from Lincoln, Nebraska, collected in August and September, sent by Prof. L. Bruner (No. 12). Smith's description of the abdomen is inaccurate as regards the punctuation.

Anärena obscuripennis, Smith, 1853.


- ♀. "Tubercle convexly truncate; abdomen closely punctured; area bordered with raised ridge, rugose but not very largely so, and laterally only granulated; wings beautiful violet; pilosity rich red (large grand species)." Type locality, Georgia. This has some resemblance to *A. Hallii*, but is quite distinct.

Andrena perplexa, Smith, 1853.

- ♀. "Tubercle truncate; area seems nearly smooth, but dull, with fine close tessellations; abdominal segments smooth and closely punctured, except towards their apices, which are rugulose." Type

locality, Georgia. This is evidently different from any species I have seen.

Andrena nivalis, Smith, 1853.

- ♀. "Tubercle ; antennal joint 3 longer than 4 + 5; area rugose at base; abdomen distinctly punctured, but on an aciculated surface." Type locality, Hudson's Bay. This is very near to *A. semirufa*, Ckll., from New Mexico; possibly it is the same species.

Andrena hilaris, Smith, 1853.

- ♀. "Tubercle of labrum wide, truncate, below its centre a projecting pencil of golden hairs; clypeus coarsely punctured, with a smooth shining carina down its middle; metathoracic area finely rugulose, with some coarse short longitudinal strigæ at its base; abdomen distinctly punctured, its surface also microscopically (hardly visibly) rugulose; wings very yellow." Type locality, Georgia. Evidently distinct from anything I have before me.


Andrena vicina, Smith, 1853.

- ♀. Length "about 14 mill.; tubercle wide, truncate; clypeus with wide unpunctured central elevation; area dull rugulose; abdomen finely rugulose all over, and distinctly but shallowly punctured." Smith gives the length as only 5 lines, and says the species closely resembles *A. nitida*. I hardly know what to make of this; the species referred to *vicina* in American collections has the tubercle low and rounded, by no means truncate; also, it does not have the very shiny, oval abdomen of *nitida*, which species, it may be remarked, has the tubercle concavely truncate. *A. vicina* is said to be from the United States and Nova Scotia.

Andrena placida, Smith, 1853.

- ♀. "Tubercle very narrowly truncated; area rather coarsely rugulose, but not margined, I think; abdomen rugulose, a few sparse punctures; length about 12 mill., much smaller and narrower insect than *vicina*—looks like a *parviceps*." From "U. S." Smith gives the size the same as that of *vicina*, but this must be a mistake. *A. placida* seems to come close to *A. Macgillivrayi*.

Andrena fastuosa, Smith, 1879.


- ♀. "Tubercle , difficult to say if actually emarginate; area and abdomen as ♂."
 ♂. "Tubercle emarginate; huge stipites! area rugose, unmargined; abdomen closely punctured." From Orizaba, Mexico. *Andrena*

argemonis, Ckll., from New Mexico, is possibly not separable from *fastuosa*.


Andrena discreta, Smith, 1879.

- ♀. "Coloured like a big bright *cetii*; tubercle emarginate; area finely rugose, unmarginated; abdominal segments densely clothed above with fulvous hairs, except the basal which is naked." Oajaca, Mexico. When describing *A. jessicae* I suggested that it might possibly be the ♂ of *discreta*, but it is now evident that this cannot be.

Andrena sodalis, Smith, 1879.

- "Tubercle ; abdomen shining, though rugulose, and also very delicately punctured; area not margined nor rugose." Oajaca, Mexico.

Andrena simulata, Smith, 1879.

- "Labrum almost pointed , I see no definite tubercle; abdomen smooth, very shining, shallowly punctured; area without ridge, rugosities slight, longitudinal at base." Orizaba, Mexico.


Andrena agilis, Smith, 1879.

- ♂. "Labrum looks truncate, I can't see tubercle; clypeus not all white, but marked with yellow like a ♀ *Ceratina*; abdomen finely punctured; area rugulose, not clearly defined at sides; central impression deep?" Oajaca, Mexico.

Andrena modesta, Smith, 1879.

- ♀. "Sides of propodeum fringed with short white hairs; area rugulose, not margined; abdomen finely punctured; no tubercle to be seen." Oajaca, Mexico.


Andrena commoda, Smith, 1879.

- ♀. "Tubercle pointed ; area not margined, fine basal strigæ; abdomen punctured, also aciculate, dull." This nearly agrees with *A. pruni*, Rob., but the tubercle of that species is not at all pointed. *A. commoda* is from Canada.

Andrena flavoclypeata, Smith, 1879.

- ♂. "Clypeus has a *third* black spot in middle of apex; tubercle hard to see through hairs, I think a little emarginate; area not ridged; abdomen tessellated, scarcely punctured." Locality, Canada. This is regarded as a synonym of *A. bipunctata*, Cresson, and is well known. The third black spot is not always present.

Andrena miranda, Smith, 1879.

- ♂ ♀. "Clypeus ; area coarsely clathrate and margined; abdomen strongly punctured." Canada. Related to *A. Forbesii*, but not the same.

Andrena mæsta, Smith, 1879.

- "Area scarcely rugulose, not margined; abdomen scarcely punctured (*lapponica* style); tubercle slightly emarginate or bilobed. Canada. This species appears to differ from any known to me.

Andrena errans, Smith, 1879.

- "Area not margined, smooth nearly; abdomen with shallow punctures; tubercle pointed (one ♀ has the discs of abdominal segments densely clothed with black upright hairs, probably a different species)." Vancouver I. This is not the north-western species which I have regarded as *errans*; the female with hairy abdomen may be *pluvialis*.

A close study shows that there are several species confused with *vicina* or *errans* in American collections. These (♀) all agree in being about 13 or 14 mm. long; the thorax densely clothed with upright rather short hair (bright ferruginous in *Hallii*, pale ochraceous in the rest); the abdomen shining black, without hairbands; the anal fimbria black; the wings decidedly brownish. The species of this series now before me are:

- A. Carlini*, Ckll.: Tubercle of labrum broad and evenly rounded; clypeus with a median impunctate ridge; hair of face mixed pale and black, of pleura black; basal area of metathorax roughened, not plicate; abdomen tessellate and well punctured; antennal joint 3 rather shorter than in *Hallii*. Illinois; Beulah, N. M., May 30 (*W. Porter*); Baldwin, Kansas, May (*J. C. Bridwell*); Ithaca, N. Y., May 17 (*Macgillivray*). Seven specimens examined.
- A. Hallii*, Dunning: Tubercle of labrum broad but truncate; median line of clypeus impunctate, but minutely tessellate; hair of face and pleura black; basal area of metathorax obliquely plicate at base; abdomen tessellate, with numerous small punctures. Pullman, Wash. (*C. V. Piper*).
- A. cupreotincta*, Ckll., n. sp.: Tubercle with sloping sides and truncate apex; clypeus without a median impunctate ridge, or it is very short and rudimentary; hair of face, cheeks, occiput and

pleura black; basal area of metathorax strongly longitudinally plicate, its sculpture entirely different from that of the adjacent lateral areas, though it has no raised margin; abdomen well punctured on a smooth surface, the punctures very strong and close at the sides of the segments; hair on inner sides of basal joints of tarsi tinged with coppery. Skokomish River, Wash., April 26, 1892 (*Trevor Kincaid*).

- A. pluvialis*, Ckll., n. sp.: Tubercle with sloping sides and truncate apex; clypeus without any impunctate line; hair of face black, a little pale at sides, of vertex and cheeks black, of occiput pale, of pleura black; area roughened, not plicate, longer than in *cupreotinda*, and so larger, larger than in *Carlini* because broader behind, its posterior angle greater; abdomen with a sericeous lustre, the punctures small; surface of abdomen quite hairy, the hairs black. Olympia, Wash., May 1, 1894 (*Trevor Kincaid*).
- A. anogra*, Ckll., n. sp.: Agrees with *pluvialis*, except that pubescence of thoracic dorsum is brighter, more fulvous; hair of face is wholly black; tubercle is small and emarginate or binodulose at apex; area is more coarsely rugulose and much narrower behind, being shaped as in *Carlini*. Colorado Springs, Colo., middle of July, at flowers of a white *Oenothera* (Ckll., 3567).
- A. vicina*, Smith: Tubercle broad and truncate, the truncation sometimes concave and distinct, sometimes rather obscure; clypeus with a median impunctate ridge, which is more or less roughened; hair of face pale, black only round the mouth, or only below the mouth; hair of cheeks, vertex, occiput and pleura pale, area roughened, large, not narrower behind, shaped as in *pluvialis*, but the sides of the metathorax are clothed with pale hair, whereas in *pluvialis* it is black; abdomen tessellate and well punctured, hardly hairy except apically, being much less hairy than in *pluvialis*; hair on first segment pale. Olympia, Wash., June 4, 1895 (*Trevor Kincaid*); Michigan (*C. F. Baker*, labeled *A. bicolor*); Hartford, Ct., May 30, 1894, and May 31st, 1896 (*S. N. Dunning*). This is evidently the true *vicina* of Smith; it ranges further north than *Carlini*.

Andrena cærulea, Smith, 1879.

- "Area smooth, not margined; abdomen rugulose with slight raised points; tubercle I think slightly emarginate." Vancouver I. *A.*

cærulea, var. *territa*, Ckll., Entom., 1898, p. 89, is perhaps a distinct species; in the description, line 15 from top of page, tinge is misprinted "fringe." *A. nigrocærulea*, from the same region, has the tubercle concavely truncate, one might say slightly emarginate, but it is otherwise different from *cærulea*.

Andrena subtilis, Smith, 1879.

"Tubercle Λ ; abdomen tessellated, hardly punctured; area smooth, not ridged laterally." Vancouver I. I do not know this species.

Andrena candida, Smith, 1879.

"Abdomen dull green, scarcely punctured; area with rugosities slight, no ridge; labrum ? a little emarginate." Vancouver I.; Olympia, Wash., June 18, 1895 (*Trevor Kincaid*). In Mr. Kincaid's specimen the hair at apex of abdomen is blackish, but the species is doubtless the same. *A. geranii*, Rob., is closely allied.

Andrena auricoma, Smith, 1879.

"Can't see labrum; a pretty insect with fulvous upright pilosity on discs of segments and golden fasciæ at the apices; area granulose, not margined." Vancouver I. Unknown to me.

BOOK NOTICE.

REPORT OF INJURIOUS INSECTS and Common Farm Pests during the year 1900, with Methods of Prevention and Remedy. By Eleanor A. Ormerod, I.L.D. London: Simpkin, Marshall & Co., 1901 (1s. 6d.; pp. 111).

It is with deep regret that we learn from the preface of this her twenty-fourth annual report that the talented authoress has decided that it shall be the last. For almost a quarter of a century Miss Ormerod has labored hard and well in the service of her country, without any remuneration and with scanty recognition from the officials who should have been the first to express their gratitude to her. But, on the other hand, she has won for herself a high reputation in Great Britain, in America, in South Africa and Australia, and also in several European countries. She is known far and wide as a painstaking entomologist, a keen observer, a diligent collector of facts and observations, a thoroughly practical and sensible adviser, and one who has been all through these years most unselfish in placing her time and her work at the disposal of those who needed them most—the farmers and gardeners of her native land.

When she began her life-work in 1877, to quote her own words, "comparatively little was known of the habits and means of prevention of insects seriously injurious to our crops, and of this little, a very small amount was accessible for public service, and I undertook the series of Reports in the hope (so far as in my power lay) of doing something to meet both these difficulties." How fully her hope has been realized is shown by her further statement: "Now, the *necessities* of the case have been gradually changing. Year after year information has been sent, gradually completing *most* of the histories of *most* of our worst insect pests, and now additional information is rarely on points of great agricultural importance." In other words, she has succeeded, by dint of long-continued and hard work, in making fully known the life-histories of all the most serious insect pests in the British Isles, and in prescribing the best available methods of dealing with them. No such work can ever be finished or ever be perfect, but Miss Ormerod has done the task of the pioneer; she has cleared away the obstructions of ignorance and has laid solidly and well the foundations of a knowledge that requires now only to be kept up and added to as time goes on and changes naturally occur. Working without remuneration and publishing at her own expense, she has done a noble and patriotic work, and her name will long live, we may be sure, in the hearts of those she helped so well, and in the affections of those who have the privilege of being her friends.

The present Report, the second of the new series, is on the same plan as its predecessor. It deals at some length with twenty species of injurious insects affecting the apple, pear and plum, currant and raspberry, potatoes, beans, wheat and mustard, ash trees and sheep's nostrils—a varied list, indeed. There is also an account of the curious flatworm (*Bipalium Kewense*) which feeds upon earthworms, and of the fungous disease which produces what are known as "bladder plums." The volume closes with short notices of some insects that have often been referred to before in these Reports—the apple Psylla, gooseberry Sawfly, cabbage Moth attacking peas, and the pine-shoot Tortrix. The various papers are illustrated with about thirty excellent wood-cuts.

We grieve to say "good bye" in this way to our venerated friend, whom we have known and esteemed for so many years. We earnestly hope that her days on earth may be prolonged, that she may enjoy a rest that she has assuredly earned, and that she may still continue her interest in Economic Entomology and give the help of her knowledge and experience when from time to time it may be sorely needed.

C. J. S. B.

Mailed May 2nd, 1901.

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The Canadian Entomologist

VOLUME XXXIII.

No. 6.

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EDITED BY

REV. C. J. S. BETHUNE,

LONDON, ONTARIO.

JUNE, 1901.

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General Index

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Entomological Society of Ontario, London, Canada.

EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

WILL COLLECT this season all orders (except Lepidoptera) in the fertile North Valley hill region of Chester County, in exchange for Phytophagous Hymenoptera and Evaniidæ, or other Ichneumonoidæa. J. CHESTER BRADLEY, 2221 Spring Garden St., Philadelphia, Pa.

WANTED.—Riley's Mo. Reports, 3, 4, 5 and 6; Fitch's Noxious Insects of N. Y. Have for exchange Riley's 2nd Report. WILMON NEWELL, Wooster, Ohio.

BRITISH GUIANA.—The advertiser is now collecting insects in Guiana. Would like to hear from anyone requiring good specimens from there. R. J. CREW, Georgetown P. O., Demerara, S. A.

DIURNAL LEPIDOPTERA wanted from the W. and N.-W. States for diurnals from Central and northern South America. LEVI W. MENGEL, Boys' High School, Reading, Pa.

ACULEATE HYMENOPTERA, especially Apoidea, wanted. Will give good exchange in Coleoptera or Hymenoptera. E. S. G. TITUS, Ft. Collins, Colorado.

LEPIDOPTERA (in papers) of any foreign country wanted in exchange for same of this vicinity. Send an assortment and receive same quantity. JOHN COMSTOCK, 1572 Ridge Ave., Evanston, Ill., U. S. A.

LEPIDOPTERA: Sphingidæ, Arctiidæ and Saturniidæ of the world desired in exchange. Liberal exchange given. HENRY ENGL, Box 369, Pittsburg, Pa., U. S. A.

WANTED.—Cicindelidæ, Carabidæ, and rare Scarabæidæ. Will give good exchange in Exotic and rare European Coleoptera (named), also Odonata and Hymenoptera from N. America. Send list to R. J. WEITH, Elkhart, Indiana.

DIPTERA wanted from Washington and British Columbia in exchange for North American Coleoptera. W. S. HUNTINGTON, 1910 N. Twenty-first St., Philadelphia.

PAPILIOS brevicauda, nitra, Oregonia, indra, female, nezahualcoyotl wanted; also Cicindelidæ, Cychrus, Carabus and Calosoma. Will give liberally in exchange. GEO. A. EHRLMAN, 2314 Sarah Street, Pittsburg, Penna.

LEPIDOPTERA.—I have a large number of both mounted and papered specimens for exchange. All are 1900 captures. Correspondence in both English and German. Address: A. KWIAT, 701 Larrabee St., Chicago, Illinois, U. S. A.

LEPIDOPTERA, in papers, of Canada and U. S. A., wanted in good exchange for fine Lepidoptera of Europe, Asia, South America. I take only first-class quality. Please to write Smith's number upon the paper. WILHELM NEUBURGER, Lepidopterist, Berlin, S. 42, Luisen-Ufer 45, Germany.

COLEOPTERA.—Will exchange Canadian Coleoptera, in papers, for Coleoptera of U. S. and Canada. Please send lists. C. J. OUELLET, Deaf and Dumb Inst., Ville St. Louis, Montreal, P. Q.

The Canadian Entomologist.

VOL. XXXIII.

LONDON, JUNE, 1901.

No. 6

PRELIMINARY LIST OF THE MACRO-LEPIDOPTERA OF ALBERTA, N.-W. T.

BY F. H. WOLLEY DOD, CALGARY.

(Continued from page 42.)

1. *Danaïs archippus*, Fab. A few migrants seen almost every year. June. Have never seen a locally-bred specimen.
2. *Euptoieta claudia*, Cram. Two specimens on Pine Creek, July, 1897, and June, 1900; probably migrants. Lacombe, June 29th, 1900 (Gregson).
3. *Argynnis cybele*, Fab. Not common; very rare in some seasons. In the hills, July and August; Lacombe, June 29th (Gregson). Mr. Elwes has seen this form and considers it correctly named. It resembles *cybele* that I have from Iowa, but is slightly smaller.
- 3a. [*A. leto*, Behr. Recorded by Geddes from Macleod. The record may perhaps refer to *cybele*.]
4. *A. cypris*, Edw. Not common. July and August. Whatever may be the correct name for this species, it is certainly distinct from anything else here listed. Dr. Fletcher calls it *cypris*, and Mr. Elwes says: "It does not agree exactly with any species, but is something between *lais*, *halcyone* and *atlantis*." *Lais* certainly resembles it more closely than anything else occurring near Calgary. I have a ♂, sent me by Dr. Fletcher, labeled *aphrodite* (but without data), which agrees well with my *cypris*, though the black markings in his specimen are slightly heavier. Neither bear any more resemblance to *aphrodite*, sent me from Binghampton, N. Y., than they do to *cybele*. Mr. Snyder treats *cypris* as the Western form of *aphrodite*, and it seems probable that the *aphrodite* recorded from Edmonton, in Northern Alberta, refers to the form I take here. Mr. Gregson tells me that he takes a form at Lacombe which Dr. Fletcher says is "near *cypris*, but

distinct." In his letter to Mr. Gregson, Dr. Fletcher adds: "If about forty of our American species are valid, this also, I think, is a valid species. I have specimens of it from the Rocky Mountains right across the plains to the borders of Ontario." I have reason to believe that he refers to the species which he named *cypris* for me a few years ago.

5. *A. lais*, Edw. Very common. June to August. Also at Banff in Aug. (Sanson). Lacombe "uplands, July, common" (Gregson).
6. *A. electa*, Edw. Not common. July and Aug.; also at Banff (Sanson). Lacombe "uplands, not common" (Gregson). One ♂ and one ♀ out of five ♂♂ and two ♀♀ in my series have been labeled *electa* by Mr. W. H. Edwards. Here I suffer sadly from lack of material, as, though the form is far less common than *lais*, I could long ago have obtained a good series, had it not been for pressure of other business during its season. I have *atlantis* ♂ from Prince Edward Island, which I cannot distinguish on the upper side from Calgary *electa*, though on under side of secondaries the spots are slightly larger, the buff submarginal band distinctly narrower, and ferruginous area more rusty reddish than in most of my short series. A ♂, sent me from Banff by Mr. Sanson, and named *electa* for him by Dr. Fletcher, is almost an exact counterpart of my P. E. I. *atlantis*, though smaller than it or any of my *electa*; whilst *atlantis* ♀, also named by Dr. Fletcher, from Mr. Gregson, of Lacombe, differs from a Calgary ♀, labeled *electa* by Mr. Edwards, only in being slightly larger. A worn ♂ which I took at Laggan last August seems to come nearer the P. E. I. specimen than does anything I have taken near Calgary. The species, whatever it is, is slightly darker than *lais*, the markings altogether heavier, and dusky brown basal area above darker and wider in extent. The veins above on primaries are also much more broadly clothed with black scales than in *lais*. On the under side the differences are less pronounced, though the ferruginous area on secondaries is usually, though not always, paler in *lais* than in the other form. The above remarks apply to the ♂♂. I have only seven ♀♀ belonging to either form, and must confess my difficulty in deciding where to place them. *Atlantis*, which is recorded by Geddes from the Rocky

Mountains of Alberta, may eventually prove to be the correct name for the species, or it is even barely possible that I may have eventually to bracket my *electa* with *lais*, but at present I certainly have no evidence to justify the placing of Alberta *atlantis-electa* material under two names.

7. *A. monticola*, Behr. Banff. August.
8. *A. halcyone*, Edw. Probably not rare in the foothills. I have examined altogether seventeen specimens, all ♂♂, taken by Mr. Hudson, who says it occurs both near Billings's lumber mill and Lineham's lower log camp. All these bear date of July 12th, though taken in different years. He also took a single ♂ near the head of Pine Creek, on July 7th, 1896, but the species has not been met with elsewhere east of the spruce. In this we have, judging from the verdicts of Drs. Skinner and Holland, a form referable to either *halcyone* or *coronis*. Allowing for the usual sexual differences, my form agrees fairly well with the figure of *halcyone* ♀ in Mr. Edwards's Butt. N. Am., except that none of my specimens have the rosy tinge on under side of primaries, and the silver spots in second row (of secondaries) are of less uniform shape than in the plate, and the ferruginous area in no case quite as dark. Many of my specimens have a decided tinge of green, noticeable only in certain lights. I have not seen his plate of the ♂. I sent a specimen to Dr. Skinner as *halcyone*, which he considered correct. I had sent the species to Dr. Holland, before seeing Edwards's figure of ♀ or receiving Dr. Skinner's opinion. I quote Dr. Holland's words: "It might as well be *coronis* as anything else. I have a specimen from Mt. Judith, Montana, in the Edwards collection, which agrees exactly with your specimen." The black markings above in the Pine Creek specimen are much heavier, and the basal area darker, than in any of those taken further west.
9. *A. Nevadensis*, Edw. Very common everywhere. July and August. It seems probable that past records of *Nevadensis*, *Edwardsii* and *Meadii*, from Alberta, all refer to one species. I have examined a large number of specimens of both sexes, taken from the mouth of Pine Creek to the foothills, and from Calgary to Sheep Creek, as well as some taken by Mr. Gregson at Lacombe,

and believe them to be all one species. As compared with the plate of *Nevadensis* ♀, in Vol. III. of Mr. Edwards's Butt. N. Am., all the ♀ ♀ I have seen are larger and darker above. The silver spots are generally more elongated, and the reddish area on primaries beneath generally brighter, especially near the base, but in some specimens almost lacking, or confined to the mere bordering of the veins. In a few ♂ ♂ this reddish tinge is absent. The shade and intensity of the green is extremely variable. One of my specimens is labeled "*Nevadensis* ♀" by Mr. Edwards himself. The specimen has lost its abdomen, but I believe it to be a ♂. I have compared specimens from Lacombe, called *Edwardsii* by Dr. Fletcher, with the south of Calgary form, and can see no difference. Dr. Skinner has seen the species, and says: "The specimens you send are certainly not *Edwardsii*, nor are they true *Nevadensis*; nor are they exactly like the Colorado *Meadii*, but they come nearest to *Meadii*." It is worthy of note that the great majority of my specimens of this species are ♀ ♀. In every other species of *Argynnis* occurring here, the proportion of ♂ ♂ taken will exceed the ♀ ♀ by at least five to one.

10. *A. eurynome*, Edw. Very common everywhere. July and August.
 Var. *clio*, Edw. Not rare, and widely distributed south of Calgary. Banff (Sanson). Mr. Gregson says it is extremely local at Lacombe. I have a specimen, which Mr. Edwards called an "unsilvered" *Nevadensis*, which I believe to be ♀ *clio*, and Mr. Elwes supports me in this view.
11. *A. myrina*, Cram. Locally common. Calgary and Lacombe, July and August. Banff, June 17th (Sanson).
12. *A. tricoloris*, Hüb. Not rare locally, on marshy ground near the spruce timber; July. Banff, June 3rd (Sanson); Laggan (Bean); Lacombe, very local (Gregson).
13. *A. chariclea*, Schneid. Very common in the mountains and as far as the eastern limit of the spruce. I believe the form is referable to *Boisduvalii*. Mr. Elwes has taken it himself at Laggan, and considers *Boisduvalii* and *chariclea* to be synonymous.
14. *A. freija*, Thunb. Common everywhere in the hills near Calgary, preferring hillsides amongst dwarf willow bushes; May (earliest

record April 30th); Banff (Sanson); Lacombe, common everywhere (Gregson).

15. *A. frigga*, Thunb.. var. *saga*, Kaden. Common in much the same localities as *chariclea*, occurring at Laggan, and eastwards nearly to Calgary. Also at Lacombe (Gregson), June.
16. *A. bellona*, Fabr. Common everywhere, end of May and June. Partially double brooded near Calgary, the second brood appearing in fewer numbers towards the end of August.
17. *A. alberta*, Edw. Mr. Bean is familiar with the habitat of this species, on mountain tops near Laggan. July?
18. *A. astarte*, Doubl.-Hew. Mountain tops near Laggan (Bean). I saw several specimens there myself on August 8th of last year (1900), on, and a few hundred feet below, the summit of Slate Mt., about three miles south-east of Laggan station. Its habits are aptly described by Mr. Bean in Vol. III. of Edwards's Butt. N. Am. I certainly found its flight to be "exceptionally swift," and even when it did not disappear over the edges of cliffs, I found it impossible to keep it in view for more than a few seconds whilst on the wing. I succeeded in taking one ♂—the only specimen I saw settle—which was doubtless the easier to net owing to its badly-worn condition. I took a badly-worn ♂ on the top ridge of Sulphur Mt., Banff, on August 12th, at an altitude of about 7,200 ft., and saw several more. I have since seen a ♂, evidently in splendid condition when taken, captured by Mr. Sanson near the same spot on June 27th, 1900. This measured 40 mm. in expanse, which is smaller than the size mentioned in Mr. Edwards's work. I hear, on good authority, that the species was taken near the Devil's Lake, about ten miles north-east of Banff, in 1898.
19. *Melitaa anicia*, Doubl.-Hew. A single ♀, rather worn, was taken by Mr. Hudson in the foothills near Lineham's lower log camp, on the south fork of Sheep Creek, about forty miles south-west of Calgary, on July 12th, 1896, at about 5,000 feet. I took several specimens (var. *Beanii*, Skinner), in indifferent condition, on August 8th, 1900, at Laggan, but did not meet with it below the timber line (about 7,000 ft.). I took it a few days later on Sulphur Mt., Banff, but scarcely below 6,000 ft. One specimen

appeared to be quite fresh. Mr. Sanson's records for Banff are May 29th and June 18th.

20. *M. Whitneyi*, Behr.? A single ♂, in fine condition, taken by Mr. Hudson in the spruce near Billings's lumber mill, on July 5th, 1896, is probably either this species or *palla*, Bd., which is recorded from the Crow's Nest Pass by Geddes.
21. *Phyciodes ismeria*, Bd.-Lec. Common at Lacombe; June (Gregson).
22. *P. tharos*, Dru. Common everywhere. June to September.
23. *P. pratensis*, Behr. Common on the hill-prairie near Calgary, June to August; Banff (Sanson).
- 23a. [*Phyciodes* sp.? A single ♀ near Lineham's lower log camp, July 13th, 1896, which I have been unable to identify. It may be an aberrant *pratensis*.]
24. *Grapta satyrus*, Edw. Fairly common; Calgary and Banff.
25. *G. faunus*, Edw. Not common; Calgary and Banff.
26. *G. zephyrus*, Edw., vel. *progne*, Cram. Common, apparently everywhere.

} July to September.

Here I must confess myself somewhat at sea in the matter of species, though I have made a careful study of all the scanty material I could obtain, including specimens kindly lent me for the purpose by Mr. Gregson and Mr. Sanson. A specimen sent me from Banff as *satyrus*, on the authority of Dr. Fletcher, resembles a Calgary specimen labeled "Like *satyrus* in Elwes's collection"; and *zephyrus*, named for me by Dr. Holland, agrees with *zephyrus* named by Dr. Fletcher from Banff, and with a Calgary specimen labeled "Like *zephyrus* in Elwes's collection." *Progne* is the name given to a Calgary specimen of the same form by Mr. W. H. Edwards, and to a similar Lacombe specimen by Dr. Skinner. Mr. Bean used to take a species at Laggan which he called *zephyrus*, and I have placed the form under that name. *Satyrus* differs from this form in having larger black spots, darker basal area above, and usually, though not constantly, larger submarginal yellowish blotches. Beneath, both forms are very variable, both in colour and shape of band and strigations, and in the shape of the white discal spot. The colour in *zephyrus* is

usually varying shades of gray, and discal spot is a fairly well rounded G or C. In *satyrus*, the colour is chocolate brown, and the spot usually a distinctly angulated L, though sometimes rather rounded and more resembling C. I am not yet fully satisfied as to the distinctness of these forms; nor yet of *faunus*, which has been applied by Dr. Fletcher to a Banff specimen, well duplicated by one from near Calgary. Above it is nearest to *satyrus*, but smaller; beneath it is almost intermediate between that and *zephyrus*, but shows greater contrast in shading than either. The green submarginal spots (beneath) are present, as occasionally in *zephyrus*, though brighter than in that form, and the white mark is of much the same type.

27. *G. J-album*, Bd.-Lec. A single specimen on Pine Creek, Aug. 25th, 1898. One more seen. Banff, August 8th (Sansou). Lacombe, August, scarce (Gregson).
28. *Vanessa antiopa*, Lin. Common everywhere. July to May.
29. *V. Californica*, Bd. One worn specimen on Pine Creek, June 25th, 1900; probably a migrant.
30. *V. Milbertii*, Godt. Common everywhere, and on the wing from April to September. Fresh specimens to be seen from July onwards.
31. *Pyrameis atalanta*, Lin. Usually very rare. My only records are June 22nd and Aug. 4th. It was not uncommon in 1900—a great year for migrants. Lacombe, July 1st, 1900 (Gregson).
32. *P. cardui*, Lin. Common some seasons, notably in 1900. Worn specimens seen towards the end of May, but I doubt whether it hibernates here; full-grown larvæ on June 10th.
33. *Limenitis arthemis*, Dru. Common in the hills. I have taken it as far east as the mouth of Pine Creek. End of June to August. Lacombe (Gregson); Anthracite (Sansou).
34. *Cænonympha inornata*, Edw. (= *ochracea*, Edw.?). Very common everywhere in the hills near Calgary and also on the level prairie. Lacombe, common (Gregson). June and July. A small portion of a second brood in September. I have both names from Mr. W. H. Edwards, but I have examined a large number of specimens and cannot recognize two species.

-
35. *Erebia discoidalis*, Kirby. Common, especially in the hills; also at Lacombe and Banff. May (earliest record, April 30th).
36. *E. disa*, var. *mancinus*, Doub.-Hew. Lacombe, in a tamarack swamp, fairly common. May (Gregson). Mr. Elwes is the authority for the name. Mr. Sanson records it from Banff. It probably occurs there, but the specimens he sent me under this name were the following species.
37. *E. epipsodea*, Butl. Very common everywhere. June and July.
Var. *Brucei*, Elwes? A single specimen of this var., or something very like it, taken at the head of Pine Creek, is in the collection of Mr. Elwes. I have never seen another.
38. *Satyrus alope*, form *nephele*, Kirby. Very common around Calgary and Lacombe. July. I have specimens labeled both *olympus* and *ariane* by Mr. Edwards.
39. *Chionobas Macounii*, Edw. Decidedly rare and very erratic in appearance. June and July. Has been taken near Calgary, Red Deer, and Morley. For further notes on this species vide CAN. ENT., XXX., p. 298, et seq. In addition to the records there given, a single specimen was seen in 1900 in the spruce near Billings's lumber mill.
40. *C. chryxus*, Doub.-Hew. Banff and Laggan. June to August. Have never seen it anywhere near Calgary.
41. *C. alberta*, Elwes. Usually very abundant on the prairie around Calgary. Far less common near the spruce limit. May and June (earliest record, May 3rd). Extremely variable in colour, mesial band on secondaries, and number of ocelli. I have specimens of both sexes without ocelli. No records from Banff or Lacombe. The validity of this species has long ago been fully established by both Mr. Elwes and Mr. W. H. Edwards. A treatise dealing fully with the form would occupy too much space here; but, for the benefit of those who still have difficulty in distinguishing it from *varuna*, it may be pointed out that the mesial band on primaries beneath, sharply toothed outwards below the cell—the tooth being invariably visible from above—as well as the usually conspicuous whiteness of the veins on secondaries, are comparatively safe guides by which *alberta* may be distinguished from the following species. The safest guide of

all is perhaps that "general appearance" which is so hard to define.

42. *C. varuna*, Edw. Very common around Calgary, especially on the level prairie, and occurring as far west as Kananaskis (Macoun); Lacombe (Gregson). June and July (earliest, May 14th). A larger and brighter-coloured species than the preceding, and perhaps even more variable; also differing somewhat in manner of flight, owing, probably, to greater strength of wing.
43. *C. jutta*, Hübn. Common in spruce woods near Calgary in June. Also at Laggan. It probably occurs at Banff, though I have no record from there.
44. *C. Beanii*, Elwes. Mountain tops, near Laggan (Bean). I took a fresh, but crippled, ♂ there myself on Aug. 8th, 1900.
45. *Thecla humuli*, Harris. A single specimen brought to me in 1894, taken on the level prairie about twelve miles south of Calgary, near the mouth of Fish Creek. I see no reason why it should not be locally common.
46. *T. augustus*, Kirby. Common. May and early June. Also at Banff (Sanson).
47. *T. irus*, Godt. Locally common near Calgary.
48. *T. eryphon*, Bd. A few specimens near Billings's lumber mill. Early June. Banff, May 24th (Sanson).
49. *T. dumetorum*, Bd. Mr. Elwes tells me he took a specimen of this species in the foothills, about 50 miles S. W. from Calgary (about May 12th, 1895?).
50. *T. titus*, Fab. Rare and local in the hills around Pine Creek. Very common in foothills near Lineham's lower log camp. August. Lacombe, July 28th, fairly common (Gregson).
51. *Chrysophanus xanthoides*, Bdl. Very rare. Head of Pine Creek, July.
52. *C. thoe*, Bdl. Locally common on low, wet ground amongst the hills on Pine Creek. July.
53. *C. mariposa*, Reak. Common near the spruce. Also at Banff and Laggan. July and Aug.
54. *C. helloides*, Bdl. Common. June and July. A second brood in far fewer numbers in September. Both Mr. W. H. Edwards and Dr. Fletcher refer my form to *florus*, Edw. I have specimens in

my series agreeing well with specimens sent me by Mr. Lyman as typical *helloides*, labeled "California and Washington."

55. *C. phlæas*, Bd.-Lec. Taken on July 5th and 12th, 1896, by Mr. Hudson, both near Billings's lumber mill and Lineham's lower log camp on Sheep Creek. In all, six specimens in fine condition. It is probably locally common. Dr. Holland has three of these specimens. He says: "They are undoubtedly *phlæas*, the European form, closely corresponding with specimens which I have from Turkestan on the upper side, but show some modifications on the under side that are of interest. . . . I have no doubt that *C. Americana* grades over into *phlæas*, and that when we come to know all about the distribution of the species, we shall see that our eastern *Americana* is a local race of the European species, and our north-west country will undoubtedly furnish us with the connecting links between the palæarctic and nearctic forms."
56. *C. Snowi*, Edw. Laggan, in August (Bean). I took a worn specimen there myself on August 10th, 1900, at about 7,000 feet.
57. *C. sirius*, Edw. Recorded in Holland's "Butterfly Book" from Macleod.
58. *Lycæna fulla*, Edw. Common, end of June and July. Lacombe, June 16th, local (Gregson).
59. *L. sæpiolus*, Bd. Common, end of May to early July. Also at Banff and Laggan.
60. *L. Couperii*, Grote. Extremely common everywhere. On the wing from the end of May, nearly all summer. Probably two broods at least. Earliest record, May 12th. Mr. Elwes tells me that this is the Calgary form of *antiacis*, Bd.
- 60a. [*L. lygdumus*, var. *oro*, Scud. Mr. Gregson has shown me Lacombe specimens which Dr. Fletcher thinks are referable to this species. In some of them the spots beneath are almost wanting, but though I cannot exactly duplicate them in my Calgary series of *Couperii*, I doubt their distinctness from that species. I certainly cannot distinguish the specimens standing in Mr. Sanson's collection as *lygdumus* from *Couperii*.]
61. *L. sagittigera*, Feld. A single ♂, perfectly fresh, on June 19th, 1900, in the poplar woods at head of Pine Creek.

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62. *L. rustica*, Edw. Common everywhere. June and July.
63. *L. shasta*, Edw. A single specimen on the Bow bottom, near the mouth of Fish Creek, on June 21st, 1894. The name is on the authority of Mr. W. H. Edwards. Visits to the locality since have failed to produce any more.
64. *L. melissa*, Edw. Common, end of May to August. A remarkably variable species. I have had the names *Scudderii* and *Anna* from Mr. Edwards, and have seen Banff specimens, labeled *Scudderii* by Dr. Fletcher, which agree with specimens in my series. I picked out some half dozen specimens showing the range of variation as much as possible and sent them to Dr. Skinner, who wrote: "They are all undoubtedly one species, and are a little off typical *melissa*, and near to var. *Annetta*." Mr. Gregson takes the same species at Lacombe. Judging from Mr. Edwards's opinion about certain forms I sent him, it is not unreasonable to suppose that the record of *Anna*, Edw., from Belly River, refers to this species.
65. *L. acmon*, Doub.-Hew. Banff, Aug. 7th (Sanson). I have seen this species, and believe it to be distinct from anything else here listed.
66. *L. pseudargiolus*, Bd.-Lec. I have a specimen taken by Mr. Elwes within a mile of my house, on May 24th, 1895, but neither Mr. Hudson nor myself have ever taken it. Mr. Gregson records vars. *marginata*, Edw., and *lucia*, Kirby, from Lacombe (end of May, not common), and Mr. Sanson says he takes var. *lucia* at Banff (May 25th).
67. *L. amyntula*, Bd. Common in June, especially near the spruce. Lacombe, in river bottoms, June, not common (Gregson). I have seen Lacombe specimens which Mr. Gregson has under *comyntas*, but cannot separate them from what I have as *amyntula*.
68. *Pieris sisymbri*, Bd. Rather rare on Pine Creek. May and June. Also at Banff and Laggan.
69. *P. protodice*, Bd.-Lec. June and August. Double brooded, the second brood being fairly common. The commonest form here agrees with *protodice*, as described in French's "Butterflies of the Eastern U. S. and Canada," but Dr. Fletcher gave me the name *occidentalis* for this form, which is also like *occidentalis*

mentioned in Holland's "Butterfly Book." *Protodice*, as there described, has secondaries beneath immaculate white in the ♂. This form occurs here rather sparingly. Scudder, in his "Brief Guide," treats them as one species, and though I doubt their distinctness, I have not sufficient local material at hand to form a definite opinion. Mr. Gregson reports *protodice* from Lacombe, "July 27th, uplands, scarce." *Occidentalis* occurs at Banff. August (Sanson).

70. *P. napi*, form *oleracea*, Harr. Fairly common; single brooded only, June and July. Mr. Edwards calls my form "*oleracea*, form *virginiensis*." It is somewhat variable, the variation probably ranging between the two forms. Mr. Gregson reports *oleracea-hiimalis* from Lacombe. "July, rather common in meadows and gardens." Mr. Sanson reports *oleracea* and *venosa* from Banff. I have seen a ♀ from Banff, dated May 3rd, which is darker than *bryonia*, Ochs., in Holland's book.
71. *P. rapæ*, Lin. Two specimens taken: ♂, July 20th, 1899; ♀, June 26th, 1900. No more observed.
72. *Anthocharis ausonides*, Bd. Common on the hill-prairie, end of May and June. Banff, May 17th (Sanson); Lacombe, July 19th, woodlands, scarce (Gregson).
- 72a. [*A. creusa*, Doub.-Hew. I have seen a Banff specimen, dated June 15th, agreeing closely with plate and description of *creusa* in Holland's "Butterfly Book." I refrain from listing it as an undoubtedly distinct species. One out of a large series of Calgary *ausonides* comes very near this specimen on the under side.]
73. *Colias elis*, Streck. Laggan (Bean); Banff, taken by Mr. H. H. Lyman and Mr. H. K. Burrison in 1890 (Bean). It cannot be common there, as Mr. Sanson does not record it. Mr. A. F. Hudson took two fine ♂♂ in the foothills at the "Lineham's lower log camp" locality on July 12th, 1896. According to Mr. Bean, the record of the *Meadii*, by Geddes, from the Kicking Horse Pass, probably refers to *elis*.
74. *C. eurytheme*, Bd. Lacombe, fairly common; August (Gregson). Common on Pine Creek in June, 1900, though not observed near Calgary in previous years. The unexpected appearance of

true *eurytheme* in considerable numbers here last June is a mystery, as it is extremely unlikely that amongst the large numbers of *christina* and *eriphyle* taken by Mr. Hudson and myself during the previous seven seasons, we should never before have taken anything resembling *eurytheme* had it occurred here annually. *Eriphyle*, which is here a very much smaller and pale lemon-yellow form, was flying at the same time, as well as *christina*, but *eurytheme* was not observed when the second brood of *eriphyle* appeared as usual in August. They agree well with *eurytheme*, from S. Dakota, and specimens have been submitted to Dr. Skinner for examination, so there is no doubt as to their identity. Of about 20 specimens taken, all except two ♀ ♀ show signs of much flight, and I at first thought they might be migrants; but Mr. Hudson, their captor, tells me that they were on the wing here for some time before he noticed that they were not *christina*. Of seven or eight ♀ ♀ taken, three were albinos.

Var. *eriphyle*, Edw. Very common; end of May and June, and again in August. I have taken fresh specimens in July. Also at Lacombe (Gregson) and Banff (Sansons).

75. *C. christina*, Edw. Common; June and July. Lacombe, August (Gregson) and Banff, August (Sansons). The pale lemon-yellow form of the ♂ is rather rare near Calgary, but is, I believe, more common in the mountains. The ♀ ♀ show most extraordinary variation. It is hard to find two alike. I have a specimen, I believe sexually a ♀, having the right side normal, of the pale, almost immaculate yellowish white variety, and on the left side showing a tendency to become an orange ♂, in having irregular dashes of orange in several places on both wings, and patches of distinctly ♂ brown marginal band near the apices.

- 75a. [*C. occidentalis*, Scud. Lacombe in August, fairly common (Gregson). The name is on the authority of Dr. Strecker. Mr. Gregson sent me three ♂ ♂ and one ♀ as *occidentalis*. The ♀ and one ♂ I believe to be *christina*. The other two ♂ ♂ are certainly very near *christina*, but differ in more than one respect from any form of that species that I have taken near Calgary. Until I can examine more material, this form must stand as doubtful.]

76. *C. pelidne*, Bd. Apparently fairly common in the spruce in July. Dr. Holland writes: "Your specimen agrees positively, point for point, line for line, and dot for dot, with a specimen labeled in the Edwards collection as *C. interior* ♂, coming from Godbout Bay, though both this specimen and yours strike me as being somewhat off type." Dr. Skinner says: "It comes nearest to *interior*, or perhaps *eriphyle*." Mr. Elwes says it "belongs to the *pelidne* group." He writes later concerning the species: "Some forms are locally constant. . . . Yours is near, and perhaps runs into, *christina*." It certainly is near *christina*, but, so far as I have observed, remarkably constant in colour, which *christina* is not. I have not often had a chance of taking it, and have only two ♀♀, very much alike, and differing from any ♀ *christina* that I have taken nearer home. The first time I took the species I took ♀♀ flying with *pelidne* ♂♂, and submitted both sexes to Mr. Elwes, who questioned their unity. As I saw no *christina* ♂♂ on that day, I believed them to be one; but the subsequent receipt of the two above-mentioned ♀♀ from Mr. Hudson convinces me that the original ♀♀ taken were not of this species.
- Var. *Skinneri*, Barnes., = *C. minisni*, Bean, MSS. Common at Laggan. I took ♂♂ in fine condition there on August 8th and 10th of last year, between 5,500 and 7,000 feet, but saw none either higher or lower. It may certainly be a small and locally constant var. of *pelidne*, but I find it hard to associate it thus closely with what I have as that species. The discal spot on primaries in all my *minisni* is more narrowly linear, the marginal band narrower, and secondaries and basal area, as well as the under side, more widely sprinkled with black scales.
77. *C. nastes*, Bd. Laggan, above timber (Bean). I was fortunate in taking four ♂♂ and two ♀♀ of this species, in fine condition, during my short stay at Laggan last August. I met with it at about 7,000 to 7,600 feet, on Slate Mountain, on August 8th. Two days later I took a fine ♂ on "Saddle Back," near Lake Louise, flying with *minisni*.
78. *Parnassius smintheus*, Doub.-Hew. Mr. Hudson took over a dozen specimens, both sexes, on July 12th, 1896, at Lineham's lower camp on Sheep Creek, where he says it was abundant. It

occurs at both Laggan and Banff. My ♀ ♀ (from Sheep Creek) are slightly darker than the figures of *smintheus*, in Vol. III. of Mr. Edwards's work, but not so dark as *hermodur*.

79. *Papilio zolicaon*, Bd. On the hill-prairie around Pine Creek ; not common ; June. Also at Olds (Willing).
80. *P. nitra*, Edw. Fairly common on the hill-prairie and in river bottoms. End of May and June. Also at Olds (Willing). I have a Calgary specimen labeled *asterias* by Mr. Edwards, but both Dr. Fletcher and Dr. Holland agree in referring the species to *nitra*.
81. *P. turnus*, Lin. Fairly common everywhere. June.
82. *Carterocephalus palæmon*, Pall. Fairly common locally near the spruce in June. Laggan (Bean) ; Banff, June 5th (Sansen) ; Lacombe, July 19th, not common (Gregson).
83. *Thymelicus garita*, Reak. Common on Pine Creek.
84. *Pamphila comma*, var. *Manitoba*, Scud. Common near Calgary. End of June to August. Have taken it at Banff in August, var. *Assiniboia*, Lyman. Far less common than *Manitoba*.
85. *P. uncas*, Edw. Far less common than the preceding species. June and July.
86. *P. draco*, Edw. Rather rare near Calgary. July. I took a specimen at Laggan in August.
87. *P. peckius*, Kirby. I have a single ♀ labeled "Pine Creek," but bearing no date, called *peckius* by Mr. Lyman, and agreeing with *peckius* from Ottawa. I have rather neglected the *Pamphilas*, and some species may be more common than I suppose.
88. *P. mystic*, Scud. Fairly common on the hill-prairie ; June and July.
89. *P. cernes*, Bd.-Lec. Probably local, and apparently not very common, though I have no records of exact localities.
90. *Pyrgus tessellata*, Scud. By no means common ; end of June and July. Mr. Gregson records *montivagus* from Lacombe. I have not seen his species, but suspect that he refers to *tessellata*.
91. *P. cæspitalis*, Bd. Banff ; June 3rd (Sansen). I have seen this species.
92. *Nisoniades icelus*, Lint. Common everywhere around Calgary ; middle of May to end of June. I have the name *brizo* from Dr. Fletcher, but have carefully examined a large number of specimens, and

find the pencil of hairs present on hind tibiae in all. Dr. Skinner's report on specimens that I have sent him convinces me that I do not take *brizo*.

93. *N. persius*, Scud. Common everywhere around Calgary. Also occurs at Banff (Sanson), middle of May and June. Dr. Fletcher labeled a specimen I sent him "*lucilius*, I believe," but Dr. Skinner, who has both species named by Dr. Lintner, considers my form *persius*. Mr. Gregson records *lucilius* from Lacombe. As Dr. Fletcher probably gave him the name, I suspect that the species he takes there is *persius*.
94. *Eudamus pylades*, Scud. Local and not common. Has been taken at head of Pine Creek and near Billings's lumber mill. June.

(To be continued.)

HOW TO GET RID OF FLEAS.

Reading in the April number of the CANADIAN ENTOMOLOGIST, Mr. Heath's account of the plague of fleas in Manitoba, recalled what I had read in the *Agricultural Gazette* of New South Wales. It appears that in the Australian bush fleas are as great a nuisance as they are in some parts of Manitoba. A settler, who had suffered greatly from their presence, wrote to the *Gazette* that he had occasion to use tar paper in his dwelling, when he discovered that fleas would not stay in the house with it, and from that time he had no more trouble with fleas in his house, although they were as plentiful out of doors as ever. Last autumn, or early winter, one of our local members, on his regular visit to the Society's room, started the enquiry as to what was the best way to get rid of fleas, as his house had got overrun with them from having allowed their dog to sleep in the cellar. I thought of what I had then recently read, hunted up the number of the *Gazette*, found the reference, and showed it to him, when he said he would try it. The next time he called he reported that it had "worked like a charm," and he at once got rid of the fleas. So here seems to be a clean, cheap, and, so far as tested, an effectual means for those afflicted of getting rid of the cause of great discomfort.

J. ALSTON MOFFAT.

NOTE ON THE RESPIRATION OF ALEURODES CITRI.

BY C. W. WOODWORTH, UNIVERSITY OF CALIFORNIA.

The effort to control the "white fly" of the orange (*Aleurodes citri*) by hydrocyanic acid gas, naturally suggested an inquiry into the respiration of these insects. The author was enabled to pursue this inquiry, while recently in Florida, under the auspices of the Florida Agricultural Experiment Station.

The only account of the organs of respiration in the young of this family is a brief note with a figure in Burmeister's Handbuch, which is very incomplete and not entirely accurate. Some very interesting and quite unique features are presented by these insects, not the least of which are the breathing folds, that are very conspicuous structures, and have been heretofore incorrectly interpreted. The view suggested by Riley and Howard (Insect Life, 1893, Vol. 5, pp. 219-226), that the anterior folds represent the original division between the head and thorax, is the one usually accepted. In reality they are wholly thoracic in position, being nearer to the pro-mesothoracic line than to the head-thoracic boundary, and they are by no means vestigial structures, but specially developed organs of respiration.

The necessity of these organs is very evident when it is noted that the spiracles open ventrally, and that the body is cemented to the leaf. The insect is nearly transparent, and very inconspicuous as it lies upon the leaf, but if the leaf is bent so that air is admitted beneath it, the insect immediately becomes whitish. An examination of the inverted insect under the microscope shows the ventral surface to be marked off into polygonal areas, with many round regions resembling glands. These correspond exactly with the cells and stomata of the leaf, and are, in fact, a mould of the surface upon which the insect rested, produced doubtless by the hardening of the secretions of the marginal glands.

The breathing folds are the only passages between the outside air and the spiracles; and they are really structures showing quite high specialization. The surface of the lumen of the groove is armed with minute scattered chitinous papillæ, and thus differs strikingly from the structure of any other part of the skin of the insect. The outer opening is guarded by a pair of oblique combs. They are produced by a modification of the serrations that elsewhere form the border of the body, and recall the guard-combs

developed at the opening of the spiracles in many insects ; they evidently serve the same function. The body of the insect is so thin that towards the edge its dorsal as well as its ventral wall is involved in the production of the fold. The inner ends of the breathing folds enlarge into conspicuous chambers, since each fold serves for more than one spiracle.

There are four pairs of spiracles present in the young of an Aleurodid, though Burmeister recognized only the anterior two pairs. He saw, indeed, the anal pair, but incorrectly identified them as sexual orifices, which he describes as being on either side of the anal opening. At this stage there are no vaginal openings, though the eggs can be clearly seen quite fully formed just anterior to the anal pair of spiracles long before the final moult. The anal opening is on the dorsal surface, and therefore really very far distant from the ventrally placed spiracles.

The anterior folds are opposite the anterior pair of spiracles, which lie between the bases of the developing front and middle legs ; these project in regular curves in nearly opposite directions. The tips of the rudiments of the middle legs reach nearly to the base of those of the hind legs ; in these intervals lie the second pair of spiracles. The third pair of spiracles lie just beyond the tips of the rudiments of the hind legs. All these are served with air by the anterior breathing folds, the three spiracles on each side opening into the three-chambered basal enlargement of the fold on that side. The fourth pair open on a Y-shaped expansion of the anal breathing fold.

The main portion of the tracheal system consists of a ventral trunk on either side reaching from the anterior to the posterior spiracle, two dorsal girdles connecting with each other the spiracles of the anterior two pairs, and on either side of the abdomen and metathorax a dorsal trunk reaching forward from the anal spiracle to about half way between the second and third pairs of spiracles, where they unite with the ventral trunks. Burmeister recognized the anterior portion of the ventral trunk and the dorsal girdles, and figures them quite accurately, but he did not make out the whole system.

The finer branches are given off as follows : The anterior spiracles lead into a trunk that almost immediately divides into two main branches, one of which quickly subdivides into about thirty-four long twigs, which spread out fanlike and serve the sides of the body from almost the middle line of the front around the sides to about the middle of the thorax. The

other main branch at once gives off the anterior dorsal girdle, and soon after divides into two about equal branches, one of which is the ventral trunk, and the other proceeds directly towards the mouth. This cephalic trachea divides into two main branches, the dorsal one of which subdivides into about eight long convoluted tubes that supply the sides of the head, the other proceeding almost to the mouth-opening, sweeps around in a conspicuous curve of over 90° , and then, breaking up into about three twigs, continues straight forward to the edge of the body.

The trunks from the second pair of spiracles divide each into two main branches, each of which gives off a small branch, the lower anteriorly and the upper posteriorly; these branches at once divide into a small number of convoluted twigs serving the immediately adjacent viscera. The ventral branch proceeds to the ventral trunk, and the dorsal forms the dorsal girdle. The third spiracle opens into a trunk that immediately divides into an external and an internal branch. The external branch soon separates into an anterior and a posterior division, each of which breaks up into about twelve long twigs, serving the edge of the body along the posterior part of the thorax and anterior part of the abdomen. The internal branch proceeds to the ventral trunk, but first gives off a small branch, which serves the adjacent viscera with about five convoluted twigs. The anal spiracles are nearly as large as the anterior ones. From each arises a ventral and a dorsal trunk, and at the point of separation a third main branch at the side. From this branch arise successively a series of about twenty-five long twigs serving the sides of the abdomen. Besides these tracheæ there are a few convoluted visceral branches given off from the trunks as follows: About eight on the anterior dorsal girdle, the same number on the anterior section of the ventral trunk, two on the middle division, and about eight in the posterior section, and the dorsal trunk gives rise to about four in the abdomen. These branches, counting those on the two sides of the body, amount altogether to about 264 twigs. The finer tracheæ divide rarely, if at all, and are quite constant in their numbers.

Some of the most striking points in this tracheation are: The sharp distinction both in structure and origin of the visceral and lateral twigs; the fact that the twigs from one spiracle rarely invade the territory occupied by those of another; and, most peculiar of all, that the twigs

from the second pair of tracheæ do not serve the border at all, but confine themselves to the region of the developing imaginal appendages.

The withdrawal of the spiracles so far from direct contact with the outer air produces a condition of isolation that should influence the results of experiments with such material as hydrocyanic acid gas. Such was found to be the case. While the insect is quite easily killed by rather smaller charges than is considered necessary for efficient work with scale insects, the time of exposure required is distinctly longer. It at least suggests the possibility that considerable time is necessary for the diffusion of the poison through the air of the breathing folds before reaching the body.

INSECTARY REARINGS OF TWO SPECIES OF MORDELLISTENA.

BY F. M. WEBSTER, WOOSTER, OHIO.

Mordellistena pustulata, Mels., was reared June 6th, 1899, from stems of *Ambrosia trifida*, Giant Ragweed, collected October 13th, 1898. From the same species of plant collected November 10th, 1899, this insect was reared April 4th, May 12th and 31st, 1900.

Mr. Coquillett has found larvæ of this species in plant stems, under circumstances that render it highly probable that they were feeding on Lepidopterous larvæ. The stems of the Giant Ragweed are populated by Lepidopterous, Dipterous, Coleopterous and Hymenopterous larvæ. In my case only by Coleopterous and Hymenopterous larvæ.

Mordellistena limbalis, Mels., was reared March 16th, 1901, from thorns of the Honey Locust, collected February 20th, 1900. No other insects had been reared from these thorns.

Mr. Schwarz thinks that the larvæ of *Mordellistena Floridensis* live in the stems of plants, deriving their nutriment therefrom; while Mr. Osborn found similar larvæ probably feeding on Dipterous larvæ, and also in plant stems.

MR. A. W. HANHAM has recently been removed from Winnipeg. His address is now: Bank of British North America, Victoria, B. C.

SOME ORIGINAL DESCRIPTIONS BY GUENÉE.

BY A. RADCLIFFE GROTE, A. M., HILDESHEIM, GERMANY.

The supposed "types" of Guenée in the British Museum have been examined, with the result that some well-established names of Noctuids have been displaced by an uncertain determination. Guenée's collection, which I saw in Chateaudun during the lifetime of the author, is now with M. Oberthier, and should be looked through. But the only evidence we have which is vital is the original description; where this is inapplicable the name should not be used. Only on this evidence can we assume that any of the British Museum specimens are the real types of either Walker or Guenée, because the collections have not been kept intact as Walker left them, and because no type labels were attached by the latter to the specimens. In these pages I have, I hope successfully, rehabilitated *Mamestra lubens*, and, by publishing the following translations, perhaps other undoubted names may be restored to their rights. I maintain, for instance, that whatever may be written on the subject, a name like *Apatela subochrea* should always be retained for the species, in reference to the contradictory opinions which have appeared in print. What we want is certainty in designating the object, and, when circumstances clearly admit of doubt and authors disagree, the *sure* title should be preferred in every case. There is now far more confusion as to specific titles of our Noctuids than formerly, when the current determinations were mainly supplied by me.

1. *Leucania insueta*, Guenée, I., 81.

"32. mm. This has much resemblance to *obsoleta*. Fore wings appearing a little less pointed at apices. They are darker; there is a small basal black line beneath median vein. The dots forming the t. p. line are more confused, more oblong, and the line is strongly deflexed at costa. The white cellular dot is hardly legible; finally the ends of the nervules are white to the fringe, where the streaks broaden a little. Hind wings blackish-gray, nowhere white. All the wings darker beneath. New York; coll. Doubleday. A single poor male."

This description does not fit *adonea* at all, which I believe to be distinct from any species described by either Guenée or Walker.

2. I append here Guenée's description of what is now commonly called *Agrotis ochrogaster* in the Canadian Reports. Since *A. turris*, Grote, and its red form, *A. gularis*, are common, this description might be

compared, and if it can be made to apply to any one example, then *ochrogaster* may be confined to the species; if not, then it seems to me not. As to *illata*, Walker, Canadian specimens seen by me so labelled were *suffusca*, to which Walker's description might well apply. It would require evidence to make me believe that Walker's supposed type in B. M. is authentic.

"A little larger than *plecta*, which it resembles in markings." (It seems to me this cannot well be said of *turris*.) "The red of primaries is paler" (this is, then, a reddish form, like *gularis*), "and the subterminal line is well marked by a dark blackish shade. The terminal dots are rounded and separate; the fringe is divided by a dark line; the spots are much larger; the reniform less constricted, and the median vein evenly white." (This latter does not seem to agree with *gularis*.) "Hind wings with a very distinct terminal series of rounded dots. Collar ochrey white, as also the abdomen, which is unicolorous and without the terminal reddish tuft (*i. e.*, of *plecta*). Am. Sept.; coll. Bdv.; one male."

The comparison by Guenée with *plecta* led me to seek for a form more resembling *plecta* than either *turris* or *gularis*. This is a matter to be left to some unprejudiced observer, who will compare sufficient material with above description. *Agrotis turris* seemed to me allied to the Californian, *A. Wilsoni*.

3. *Catocala micronympha*, Guenée, III., 102.

"Shape and form of *protonympha*, which it is very near, and from which it is only distinguished by slight, though constant, characters. Such are the more pointed apices, more brownish shade of colour, the shape of t. p. line, the band of hind wings more angulate, the [markings of the] base of primaries beneath, the thinner palpi, etc. Fore wings slightly dentate, costa arching outwardly, apex quite sharp; of a chestnut brown, varied with whitish-gray and blackish. The two median lines distinct, but narrow, separated above and approaching below; the t. p. line forming, at end of cell, a strong bend, with two teeth, of which the inferior is almost obsolete, after which the line is nearly regularly waved, without any inward bending below submedian vein, which latter is shaded with black throughout its length. Reniform replaced by a simple black mark. Median shade well marked, but interrupted on cell, and turning thence towards terminal margin, where it stains with blackish

two or three of the veins. Subterminal whitish, waved zigzag, nearly perpendicular, touching in passing the principal tooth of t. p. line. Hind wings dark yellow, with broad arcuated border, interrupted at usual place to form an anal spot; a narrow median band a little angulated, and two rays of blackish hair joining it. Beneath the band is broader, especially at costa, near which it nearly attains, or is joined, to the base. Fore wings beneath entirely yellow to the first black band. Am. Sept.; one male."

We could not fit this with *fratercula*, G. & R., on account of the chestnut brown primaries, and some other points. Where Guenée compares with a European species this latter should be procured and used to check the identification.

4. *Catocala Belfragiana*, Harvey.

This name has been supplanted by *messalina*, whereas the description of the latter presents an important difference of the band on secondaries. Possibly Guenée's species is something quite different, and I protest against the use of *messalina* for this species until Guenée's type is compared, or a variety of *Belfragiana* is turned up which is covered by Guenée's description of *messalina*.

THE COCCIDÆ OF BRITISH NORTH AMERICA.

BY GEO. B. KING, LAWRENCE, MASS.

The following list of the Coccidæ found to inhabit Canada is complete, so far as the published records show, together with some other information derived from corresponding with Prof. Cockerell, Dr. Fletcher, and Mr. John Dearnness. Much, however, has been obtained from material sent to me for identification. In reviewing the list it will be seen that Ontario has 25 species of Coccids credited to her; while Ottawa has 18; Toronto, 6; Quebec, 3; Prince Edward Island, 3; Nova Scotia, 4; New Brunswick, 2; and British Columbia, 6. One has been found in an ants' nest, 8 in greenhouses, and there have been 8 new species described from Canada. There are 46 species, 27 of which are native to North America, 14 are introduced, and 4 whose home is unknown, but which were probably introduced. The large majority of the species have been found by Dr. Fletcher, or at least have passed through his hands. Much credit, however, is due Mr. John Dearnness, who has taken great interest in looking for these very injurious insects,

and has sent me several very interesting species. The following also deserve mention, who have found one species each : Messrs. John Morley, R. J. Crew, A. H. McKay, and Rev. G. W. Taylor. Of the 46 species cited, I have had the pleasure of studying 36. The bibliography given refers only to such works as make mention of British North American species.

COCCINÆ.

Eriococcus, Targ.-Tozz.

Eriococcus borealis, Ckll., 1899. (Native.) Found on willow (*Salix*) at Dawson City, 64° N. Lat., by Mr. John Morley.

Bibl.—CANADIAN ENTOMOLOGIST, Vol. xxxi. (1899), 370. Originally described from Dawson City, British North America.

Phenacoccus, Ckll.

Phenacoccus Dearnessi, n. sp. (Native.) Sac white, the sac wholly covering the body. ♀ dark red-brown. Boiled in caustic potash the derm is colourless. Legs and mouth-parts ochreous. Antennæ pale yellow, 9-jointed: 3 longest, although 2 + 3 are sometimes equal, 9 next and a little longer than 1, 5 + 8 next and equal, 6 + 7 are shortest and equal. The joints are quite variable in length, as will be seen from the following measurements :

Joint	1	2	3	4	5	6	7	8	9	
	40	56	60	28	44	36	36	32	60.	Formula (39)215(67)84.
	40	60	60	32	26	28	28	32	52.	" (23)915(48)(67).
	40	52	52	40	40	28	28	32	52.	" (239)(145)8(67).
	44	56	52	24	36	32	56	60	an	8-jointed form, hardly adult.

Legs short, stout.

Middle leg : coxa, 80; fem. with troch., 180; tibia, 116; tarsus, 72; claw, 24.

Hind leg : " 88; " " 200; " 148; " 84; " 24.

Scattered over the body are several long thin hairs and short thick spines. The gland-pits are not numerous, and are very small. Caudal tubercles large, round, with two long setæ, and several long thin hairs; the tubercles are well covered with short, stout, spear-shaped spines. Young larva : Antennæ 6-jointed, measuring as follows : Joint—(1)24. (2)32. (3)40. (4)24. (5)24. (6)68.

Hab.—On an old hawthorn tree near London, Ontario, June, 1900. Collected by Mr. John Dearness, to whom the insect is dedicated. This species is allied to *P. gossypii* and *P. helianthi*, but differs from both in the legs being much shorter, and in the colour of the legs and antennæ.

(TO BE CONTINUED.)

NEW GENUS INCLUDING TWO NEW SPECIES OF SALDIDÆ.

BY HERBERT OSBORN, OHIO STATE UNIVERSITY, COLUMBUS, OHIO.

SALDOIDA, nov. gen.

Head narrower, eyes nearer together than in *Salda*, ocelli approximate, frontal ridge weak, becoming obsolete at base of tylus, bucculæ enlarged; antennæ with the two distal joints incrassate, rostrum as in *Salda*, basal joints very thick, second elongate, terminal very slender. Prothorax bearing two very prominent conical tubercles on anterior lobe, which is narrow, cylindrical, not carinate anteriorly; posterior lobe short, carinate laterally, widening rapidly to humeri.

SALDOIDA SLOSSONI, n. sp.

Hind angle of pronotum obtuse, not produced into a sharp angle or horn. Light brown, marked with reddish-yellow and black, face testaceous. ♀ — Length to tip of elytra, 3 mm.; width at humeri, scarcely 1 mm.

Head obtusely triangular, subcordate, inclined, the part in front of the eyes nearly equal to eyes in length, very sparsely set with erect hairs; eyes large; vertex narrow, less than width of eye; ocelli minute, set close together; antennæ long, joint two longer than one, equal to three, three much swollen, four equalling one in length, and about half as thick as three; rostrum reaching to apex of hind coxæ. Prothorax with two very large, erect, conical tubercles occupying the upper surface of the anterior lobe; posterior lobe short, much widened behind, concavely emarginate, the lateral angles obtusely angulate. Scutellum large, anterior border convex, surface polished, minutely punctate, apex inflated, highly polished. Elytral membrane subhyaline, with four cells and a wide margin, wings reaching to tip of elytra, milky hyaline.

Colour: Vertex black, with margins next eyes red-brown; face and rostrum testaceous; antennæ, basal two-thirds of second joint and all of third fuscous, apex of one and two whitish, fourth yellowish brown, darker at base and minute tip; prothoracic tubercles red-brown, posterior lobe yellowish brown, anterior margin and band back of the tubercles black; scutellum black, apex piceous brown; elytra brown, claval suture and apical margin of corium black, corium with two triangular whitish spots, the bases of which merge into the hyaline costa, membrane with fuscous base and hyaline apex; beneath black, with throat, pleural pieces, coxæ and legs yellowish brown, darker on disc of coxæ, apical portion of femora

and base of tibiæ, the apex of tibiæ and last joint of tarsus, fuscous; margin of last ventral segment whitish.

Described from one specimen (♀) from Florida, collected by Mrs. Annie Trumbull Slosson, to whom it is most respectfully dedicated. This and the following, which are certainly most exquisite little creatures, have been in my hands for some years, but publication of the descriptions has been deferred in hopes that additional material, representing both sexes, might make more perfect descriptions possible. It seems desirable, however, that they should not be omitted in a systematic work on the family such as is now being prepared by Prof. Summers, and hence their publication at this time.

SALDOIDA CORNUTA, n. sp.

Hind angles of pronotum produced into conspicuous horns. Black, marked with brown. ♀—Length, 2.5 mm.; width at humeri, .75 mm.

Vertex and front minutely gibbous, sparsely set with short appressed hairs; ocelli minute, approximate; antennæ with joints one, two and four nearly equal in length, joint three about one-half longer, and much swollen, fourth less swollen; rostrum about reaching hind coxæ. Conical tubercles of the pronotum very slightly divergent, otherwise almost precisely like those of *Slossoni* in shape; the posterior lobe of pronotum very short, posterior angles produced into prominent upturned horns, with a blunt polished tip. Scutellum minutely roughened, becoming smooth at apex, not inflated. Elytra subhyaline on costa, the membrane rather coriaceous, with veins obsolete, apparently with three cells and rather narrow margin. Wings aborted, unless accidentally broken off in this specimen.

Colour: Vertex, front, third joint of antennæ, prothorax except posterior horns, scutellum, claval sutures and apex of corium, pectus and base of last ventral segment, black; clypeus, rostrum, joints one, two and four of antennæ, posterior horns of pronotum, coxæ and apices of femora, reddish brown; a brown patch on disc of clavus and base of corium, a whitish oblique spot on corium merging into the hyaline costa. Membrane deeply infuscated; the first and fourth joints of antennæ are widely whitish, as also the hind coxæ, base of femora and the apical two-thirds of last ventral segment, the central part of which is transparent, showing ovipositor clearly.

Described from one specimen (♀) collected by Mrs. Slosson in Florida.

AN EXPERIMENT IN THE IMPORTATION OF BENEFICIAL INSECTS.

BY F. M. WEBSTER, WOOSTER, OHIO.

In the February number of the CANADIAN ENTOMOLOGIST I gave the results of an experiment in the exportation of a few of our native lady beetles to South Africa. I now have the pleasure of giving the result of an experiment in the importation of some South African lady beetles.

March 27th, Mr. C. W. Mally, Assistant Government Entomologist, sent me several specimens of *Exochomus nigromaculatus*, and quite a large number of two smaller, unnamed species. All of these attack more especially the Mealy bug, *Dactylopius*, in their native home. The consignment was made by simply fastening twigs of Oleander very badly affected with Mealy bug, to the bottom of the box, and putting the lady beetles among them. The package reached me April 23rd, and, strangely enough, there were but very few of the specimens that were not alive and active. The importation was thus an entire success. Mr. Mally writes me that, about Cape Town, these lady beetles are kept considerably reduced in numbers by a small Hymenopterous parasite. In releasing the lady beetles, we took precautions not to allow these parasites to escape, so that the insect, if it secures a foothold in this country and stands the climate, will have no natural enemies to hold it in check. In cases like this, and more especially in the one previously recorded, any permanent establishment of these insects would be to a certain extent accidental; that is, in the former case the lady beetles were not sent out to prey upon an insect in South Africa, whose original home was in America. In the present instance these lady beetles will probably destroy the Mealy bugs in conservatories, but it is yet to be determined whether they can withstand the rigours of our northern climate in the open. Very many injurious species are introduced and become established in this country through pure accident, and it would seem that we might expect an occasional instance of this kind to occur among beneficial insects intentionally introduced; but the principal motive in these two transactions has been, not so much with a view of colonizing these insects in the respective countries, as to secure information that would be of service to us in future transactions of this kind.

These experiments cost practically nothing, and through them we shall be able to get a better idea of the best methods of sending beneficial insects from one country to another, so that when an opportunity does

occur, where we may feel reasonably sure of success, we shall be in better shape to send insects of this character in a manner most likely to enable them to reach their destination with the least number of fatalities while in transit. It is by this continually doing something that we are some day enabled to accomplish much.

THE LINNÆAN GENUS GRYLLUS—ADDITIONS AND CORRECTIONS.

Quite recently I was kindly informed by Mr. S. H. Scudder, that in my paper on the divisions and species of the original genus *Gryllus* (CANAD. ENT., XXXIII., pp. 118-121), I had overlooked the fact that Fieber's paper had appeared in Lotos in 1853. With the information furnished by Mr. Scudder, I examined the work, and found that *Mecostethus* appeared in the May number, on page 99, and *Pachytylus* and *Psophus* in the June number, on pages 121 and 122, respectively. This fact further clinches the Linnæan *Locusta* on Fischer's *Stenobothrus*.

The date given for Thunberg's *Gomphocerus* is erroneous, and should be 1815, while the original spelling of Bolivar's "*Humbella*" is *Humbe*.

IA A. G. REHN, Philadelphia.

ERRATUM.—Page 129, line 15, for "*Ziphidium*" read *Xiphidium*.

Mailed June 3rd, 1901.

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EDITED BY

REV. C. J. S. BETHUNE,

LONDON, ONTARIO.

JULY, 1901.

LONDON :

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1901.

WANTED.—A young man to act as secretary and assistant in entomology. Address, stating qualifications: HENRY H. LYMAN, 74 McTavish St., Montreal.

EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

CICINDELIDÆ.—Wanted (Henshaw's List) Nos. 19b, 20, 23, 25d, 25g, 25h, 34b, 37, 48, 49, 50, 56. For *C. Willistoni* and *C. tenuicincta* write for terms.—W. KNAUS, McPherson, Kansas.

WANTED.—Insect Life, Vol. II., Nos. 1, 2, 9; Vol. IV., Nos. 7, 8, 9, 11; and Bulletins 1 to 4 of Cornell Exp. Station. Will give double exchange for same. WILMON NEWELL, Wooster, Ohio.

WILL COLLECT this season all orders (except Lepidoptera) in the fertile North Valley hill region of Chester County, in exchange for Phytophagous Hymenoptera and Evaniidæ, or other Ichneumonoidea. J. CHESTER BRADLEY, 2221 Spring Garden St., Philadelphia, Pa.

BRITISH GUIANA.—The advertiser is now collecting insects in Guiana. Would like to hear from anyone requiring good specimens from there. R. J. CREW, Georgetown P. O., Demerara, S. A.

DIURNAL LEPIDOPTERA wanted from the W. and N.-W. States for diurnals from Central and northern South America. LEVI W. MENGEL, Boys' High School, Reading, Pa.

ACULEATE HYMENOPTERA, especially Apoidea, wanted. Will give good exchange in Coleoptera or Hymenoptera. E. S. G. TITUS, Ft. Collins, Colorado.

LEPIDOPTERA (in papers) of any foreign country wanted in exchange for same of this vicinity. Send an assortment and receive same quantity. JOHN COMSTOCK, 1572 Ridge Ave., Evanston, Ill., U. S. A.

LEPIDOPTERA: Sphingidæ, Arctiidæ and Saturniidæ of the world desired in exchange. Liberal exchange given. HENRY ENGEL, Box 369, Pittsburg, Pa., U. S. A.

WANTED.—Cicindelidæ, Carabidæ, and rare Scarabæidæ. Will give good exchange in Exotic and rare European Coleoptera (named), also Odonata and Hymenoptera from N. America. Send list to R. J. WEITH, Elkhart, Indiana.

DIPTERA wanted from Washington and British Columbia in exchange for North American Coleoptera. W. S. HUNTINGTON, 1910 N. Twenty-first St., Philadelphia.

PAPILIOS brevicauda, nitra, Oregonia, indra, female, nezahualcoyott wanted; also Cicindelidæ, Cychrus, Carabus and Calosoma. Will give liberally in exchange. GEO. A. EHRLMAN, 2314 Sarah Street, Pittsburg, Penna.

LEPIDOPTERA.—I have a large number of both mounted and papered specimens for exchange. All are 1900 captures. Correspondence in both English and German. Address: A. KWIAT, 701 Larrabee St., Chicago, Illinois, U.S.A.

LEPIDOPTERA, in papers, of Canada and U. S. A., wanted in good exchange for fine Lepidoptera of Europe, Asia, South America. I take only first-class quality. Please to write Smith's number upon the paper. WILHELM NEUBURGER, Lepidopterist, Berlin, S. 42, Luisen-Ufer 45, Germany.

COLEOPTERA.—Will exchange Canadian Coleoptera, in papers, for Coleoptera of U. S. and Canada. Please send lists. C. J. OUELLET, Deaf and Dumb Inst., Ville St. Louis, Montreal, P. Q.

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VOL. XXXIII.

LONDON, AUGUST, 1901.

No. 8

A LIST OF MANITOBA MOTHS.—PART V.

BY A. W. HANHAM, WINNIPEG, MAN.

(Continued from page 320, Vol. XXXI., November, 1899.)

The Geometers of this Province, in respect to both my own captures and those of other collectors which I have been privileged to see, appear to be fairly well identified.

In December last I was honoured by a flying visit from Mr. Hutchinson, of Kinosota, on Lake Manitoba. He brought in a whole collection of things with him, some for names, others for my benefit. Among the moths we were unable to tackle satisfactorily were a few Geometers. Our friend is developing into an enthusiastic entomologist, and we look for some good work from him in the near future. Few of us, I fancy, would care to be hampered with numerous cases of insects, in addition to other "impedimenta," when undertaking a seventy-mile sleigh drive in bitter weather to reach the nearest railway station.

Another enthusiast, Mr. Heath, has, I believe, made some fresh captures since I saw his things, and there may also be some additions lurking in Mr. Criddle's cases. I believe that everything in the collections of Messrs. Boger and Marmont has been located.

The comparatively small percentage of unnamed or doubtful species in this family is a matter for congratulation. At the same time, I question if it has received as much attention from us as the others already listed and no doubt species have been overlooked among the more difficult genera, as *Leptomeris*, *Eois*, *Tephroclystis*, *Eucymatoge*, etc.

My most successful collecting has been done at light, and many of my best things were taken in that way.

The season of 1900, though an unusually long one for Manitoba, was an "off" year for Geometers in this district, and there was a great paucity of both species and individuals. The snowfall was light, the spring an early and hot one, and no rain fell, worth mentioning, until the beginning of July. I have no doubt whatever that these weather

conditions had a good deal to do with the absence or scarcity of a large proportion of our usually common Bombyces and Geometers.

From time to time I submitted my unknown and doubtful captures to the late Rev. G. D. Hulst (whose recent classification has been followed in this list), from whom I always received kindly aid. I received a letter from him, dated but a few days before his untimely death, regarding two new species, which I have included in this list, named by him as recently as June 25, 1900. Help has also been given freely by Prof. H. G. Dyar, to whom my thanks are due.

Eudeilinea herminiata, Guen., has not been included in this list, as I understand it has been transferred to the Bombycidæ.

Dyspteris abortivaria, H.-Sch. July 1st. Elm Park. Rare.

Nyctobia fusifasciata, Wlk. May 18th and later. Quite rare.

Rachela Bruceata, Hulst. On the wing early in October. Not plentiful.

Paleacrita vernata, Harr. April. Not common here.

Alsophila pometaria, Peck. Seldom out before October. Common.

Eudule mendica, Walk. (Already listed with the Bombyces). Early in July. Abundant in dark woods.

Tallegda tabulata, Hulst. May and July. Common at light and at rest on trees in woods.

Nannia refusata, Walk. (*Harveinata*, Pk.). End of June. Very common in Elm Park.

Tephroclystis implicata, Walk. June. A few at light.

" *ornata*, Hulst. June. Rare.

" *miserulata*, Grt. June. Rare.

" *absynthiata*, L. May and August. Here and at Brandon.

" *zygædenata*, Pack. June. Rare.

Tephroclystis raveocostaliata, Pack. Plentiful at light, middle of May, 1898.

Tephroclystis borealis, Hulst. (Unique.)

Tephroclystis latipennis, Hulst. First recorded from Quebec. Descriptions of these two new species appear on page 114, Vol. XXX. (1898).

Eucymatoge anticaria, Walk. (*Strattonata*, Pk.). Middle of June. Rare.

" *intestinala*, Guen. Early in July. Common at light.

" *vitalbata*, Hüb. June. Only a pair taken. Rounthwaite.

Venusia duodecimlineata, Pack. May. Rare here.

- Venusia comptaria*, Walk. (perlineata, Pack.). Rare. Another early thing.
- Euchoeca albovittata*, Guen. July 4th, etc. Flies low in dark woods, and is difficult to follow.
- Euchoeca cretacea*, Pack. June. Have a pair from here and another from Quebec.
- Euchoeca lucata*, Guen. June. Not uncommon in Elm Park, at rest on trees.
- Euchoeca albogilvaria*, Morr. (Now *Acidalia albifera*, Walk. See September number of Entomological News.) June. Common in Elm Park.
- Calocalpe undulata*, L. July. Occasional in Elm Park, and at rest.
- Philereme formosa*, Hulst. Only one taken.
- Eustroma diversilineatum*, Hüb. July. At light.
- “ *populatum*, L. Middle of July, at light, but not plentiful.
- Eustroma testatum*, L. End of August. Common in ravine near Experimental Farm, Brandon.
- Eustroma destinatum*, Moesch. (and var. *lugubratum*, M.). Brandon and Rounthwaite. Another rather late species.
- Plemyria hastata*, L. Early in July. Rounthwaite and Cartwright.
- “ *tristata*, L. Middle to end of July. Rounthwaite.
- “ *sociata*, L. June into July. Common.
- Percnoptilota fluviata*, Hüb. Quite common here.
- Mesoleuca ruficiliata*, Guen. June. Not common.
- “ *lacustrata*, Guen. Fairly common. July.
- “ *intermediata*, Guen. Occurs here.
- “ *truncata*, Hüb. Quite rare here.
- “ *hersiliata*, Guen. Cartwright only.
- “ *vasaliata*, Guen. Kinosota. Rare.
- Hydriomena sordidata*, Fab. (var.). May 29th (one). Also from Cartwright.
- Hydriomena trifasciata*, Bork. Common. Appears to be double brooded.
- “ *californiata*, Pack. May 20th (one).
- Hydriomena latirupta*, Walk. Common. This species must be double brooded, as I took some this season at sugar, at Brandon, on October 10th.
- Hydriomena multiferrata*, Walk. July 3rd. One at rest in Elm Park.

Triphosa dubitata, Linn. This species has much the same habits and tastes as the Noctuids; it turns up every season, but is never common. Have taken it at light in April, in May under log on ground and under loose bark of stump. On October 8th I took one at sugar, and in the fall and winter have found specimens in my cellar.

Cœnocalpe magnoliata, Guen. June. Not common here.

Gypsochroa designata, Bork. July. At light.

Xanthorhœ ferrugata, Hüb. Common, May and June, at light.

Xanthorhœ unidentaria, Haw. Appears to be rare here; have three specimens.

Xanthorhœ munitata, Hübn. Cartwright. Named for Mr. Heath by Prof. J. B. Smith.

Xanthorhœ montanata, Haw. Have a pair.

Hæmatopsis grataria, Fab. One of our common species; comes freely to light.

Mycterophora Slossoniæ, Hulst. I got my first specimen on July 15th, 1894, in the house; the second the following year, in my cellar. For description see page 120, Vol. XXX. (1898).

Synelys ennuclata, Guen. June and July. Elm Park.

Synelys alabastaria, Hub. (reconditaria, Walk.). June and July. Elm Park.

Xystrota hepaticaria, Guen. Unique. Cartwright.

Cinglis purata, Guen. July 13th. I have only taken a pair.

Leptomeris quinquelinearia, Pack. June. Common.

“ *magnetaria*. Cartwright.

Eois inductata, Guen. A common prairie species, on the wing early in June and in August.

Eois Hanhami, Hulst. Out early in June. Have only taken this species and the following in dark woods. (Elm Park.)

Eois persimilis, Hulst. Out early in June. Both these new species are described in June number of Vol. XXX. (1898).

Callizzia amorata, Pack. Taken at light, from middle of June into August. Not common.

Calledapteryx dryopterata, Grt. June 17th, etc. One or two taken at light. Mr. Hutchinson tells me that he finds this species fairly abundant at Kinosota, on Lake Manitoba.

Chlorochlamys chloroleucaria, Guen. June. Not very plentiful.

- Nemoria subcroceata*, Walk. Cartwright and Rounthwaite.
Eucrostis incertata, Walk. (*gratata*, Pack.). May into June. Common at Bird's Hill.
Synchlora glaucaria, Guen. End of June into July. Occasional at light.
Aplodes mimosaria, Guen. Out with *glaucaria*, but more numerous.
Anaploides iridaria, Guen. (*rectaria*, Grt.). The only Manitoba specimen I have seen is in Mr. Boger's collection.
Brephos infans, Moesch. Mr. Heath has taken this at Cartwright.
Leucobrephos Middendorfi, Men. April 25th, 1896 (a ♂). Recorded in January (1897) number of CANADIAN ENTOMOLOGIST. Mr. Heath has taken this fine moth, and Mr. Dennis, of Beulah, sent me a ♀ for identification.
Epelis truncataria, Walk. Aweme and Cartwright.
Epelis Faxonii, Minot. June 12th, etc. Common locally on prairie. Flies freely during the day.
Eufidonia notataria, Walk. Middle of June. Particularly plentiful at Rounthwaite in 1899.
Orthofidonia exornata, Walk. June 11th. One at light. Taken also by Mr. Marmont and Mr. Hutchinson.
Orthofidonia semiclarata, Walk. End of May into June. Rare at Bird's Hill.
Orthofidonia vestaliata, Guen. Common. Our first white moth on the wing.
Gueneria basilaria, Walk. June. Not uncommon.
Deilinia elimata, Hulst. June. Occasional.
“ *variolaria*, Guen. June. Quite common.
“ *erythremaria*, Guen. June. Not uncommon.
“ *exanthemata*, Scop. June. Not uncommon.
Deilinia solamata, Hulst. June 19th and July 22nd (1898). Single specimens flying by day on the prairie.
Sciagraphia granitata, Guen. July. Not at all common. Taken at light.
Sciagraphia denticulata, Grt. July 13th. A pair at light. More abundant at Rounthwaite.
Sciagraphia muscariata, Guen. Elm Park. Rare.
“ *heliothidata*, Guen. One at light.
Sciagraphia continuata, Walk. Cartwright and Rounthwaite. Rather a rarity.

Sciagraphia mellistrigata, Grt. Common at light, middle of May and again in July.

Philobia enotata, Linn. June. Common in Elm Park.

Macaria eremiata, Guen. July 22nd (1898). One on prairie.

“ *dispuncta*, Walk. June 29th (1898). One in Elm Park.

Diastictis ribearia, Fitch. July. Quite plentiful. Comes freely to light.

“ *sulphuraria*, Pack.

Diastictis flavicaria, Pack. Both these species are out early in August ; neither are common.

Diastictis pustularia, Hüb. (*latiferrugata*, Walk.) Have seen this from Cartwright and Rounthwaite. Appears to be rare.

Diastictis subalbaria, Hulst. Not common here.

“ *subfalcata*, Hulst. July. A pair taken.

Sympherta julia, Hulst. July 13th, etc. A few at light.

Apæcasia defluata, Walk.

Apæcasia atropunctata, Pack. Neither of these species appear to be common here.

Alcis sulphuraria, Pack. (*baltearia*, Hulst). July. At light ; three specimens.

Alcis atrolinaria, Hulst. May 20th. One at rest on fence.

Amilapsis subatomaria, Guen. July 7th, etc. Elm Park, at rest on trees.

Paraphia deplanaria, Guen. Elm Park. Rare.

Selidosema humarium, Guen. One specimen only.

Selidosema umbrosarium, Guen. Common in Elm Park early in the summer. At rest on trees, sometimes congregating under loose bark.

Cleora indicataria, Walk. May 17th. One or two at light.

Cleora larvaria, Guen. One specimen only.

Melanolophia canadaria, Guen. May 22nd and later. Common and variable.

Ectropis crepuscularia, Schif. Plentiful early in the summer.

Lycia ursaria, Pack. Rounthwaite. An early species. (Appears to be plentiful at Kinosota.)

Lycia cognataria, Guen. June. Not uncommon at rest on houses, fences, etc., and some have been taken at light.

Nacophora quernaria, Ab. Sm. Cartwright.

- Apocheima Rachelæ*, Hulst. Mr. Marmont took a male of this species at Rounthwaite in 1898. The female, which is wingless and spidery, dropped into the grass and escaped. In 1899 he was more fortunate, capturing several males and a female. About dusk on April 27th (same year), I noticed a number of moths flying low about the ground and along the side of my house. I managed to bottle four, and later on, with a light, discovered a pair "in coitu" on my cellar window. On the 29th I took two more males at rest on the same window.
- Erannis tiliaria*, Harr. Cartwright and Rounthwaite. Have not taken it myself in Manitoba.
- Cingilia catenaria*, Cram. A September species. Brandon and Rounthwaite. Mr. Marmont finds them very abundant in a small swamp near his place. Those I have seen from Manitoba have been white; those from Quebec invariably smoky.
- Dyscia orciferata*, Walk. A typical prairie species. Taken at Bird's Hill, and quite common at Rounthwaite in 1899. On the wing from early in June into July.
- Anagoga occiduaris*, Walk. May 22nd, one, and another at light in June.
- Sicya macularia*, Harr. July 19th, etc. Common at light in 1897 for about a week; also taken at Brandon.
- Therina endropiaria*, G. & R. Quite rare here.
- Therina fervidaria*, Hüb. Aug. 18th, etc. Common in Elm Park, at bloom; comes occasionally to sugar.
- Metrocampa perlata*, Guen. July 19th, etc. Not uncommon at light in 1897.
- Eugonobapta nivosata*, Guen. July. A few at light.
- Ennomos subsignarius*, Hüb. Aug. 9th to Sept. 22nd. A few at light.
- Xanthotype crocataria*, Fab. Plentiful at beginning of July.
- Plagodis serinaria*, H.-S. Taken at Kinosota by Mr. Hutchinson. Appears to be rare in the Province.
- Plagodis phlogosaria*, Guen. Cartwright.
- Hyperitis amicaria*, H.-Sch. (and var. *alienaria*, H.-S.). May 20th, and common in June. Some of the varieties are very handsome.
- Ania limbata*, Haw. July. A few at light.
- Gonodontis hypochraria*, H.-Sch. On the wing from the end of May to the end of June.

- Gonodontis Warneri*, Haw. June 17th and 20th. Here and at Rounthwaite. Not common.
- Euchlæna obtusaria*, Hüb. Rare at light in June.
- Euchlæna effectaria*, Walk. Common at light in June.
- Euchlæna Johnsonaria*, Fitch. (*bilinearia*, Pack.). A few at light about the middle of June.
- Euchlæna amœnaria*, Guen. Cartwright.
- Euchlæna pectinaria*, Schiff. (var.). Rare at light in June. This is one of our most handsome Geometers.
- Euchlæna abnormalis*, Hulst. June 22nd, 1898. One specimen taken at light.
- Selenia alciphearia*, Walk. May 20th. A pair at light.
- Metanema inatommata*, Guen. July 3rd, etc. Not uncommon at light.
- Metanema determinata*, Walk. June 17th. A pair at light; also from Cartwright.
- Pryocycla armataria*, Guen. May 24th (1898). One at light.
- Azelina peplaria*, Hüb. (*Hubnerata*, Guen.) (*and atrocolorata*, Hulst.). June 4th, etc. Common at light in 1898.
- Azelina Behrensata*, Pack. June. A few at light.
- Caberodes confusaria*, Hüb. (*and var. metrocamparia*, Guen.). July. Winnipeg and Brandon. Not common.
- Tetracis crocallata*, Guen. June into July. A few at light.
- Sabulodes lorata*, Grt. June into July. Also at light.
- Sabulodes sulphurata*, Pack. (near var. *imitata*, Hy. Edw.). A poor specimen taken at light in June.
- Sabulodes depontanata*, Grt. (now *Hypererytha arcasaria*, Walk. See September number of Entomological News). Cartwright.
- Sabulodes transversata*, Dru. End of August to middle of September. Very common at light and at bloom.
- Abbottana clemataria*, Ab. & Sm. May 13th, etc. Rather rare here; plentiful with Mr. Hutchinson.

We may congratulate DR. H. GUARD KNAGGS on the fact that his "Lepidopterists' Guide for the Use of the Young Collector of Butterflies and Moths" has this year been reprinted for the third time. (Published by Gurney & Jackson, 1 Paternoster Row, London, E. C., England. Price, one shilling.) It is 30 years since the first edition appeared, and many thousand copies have been sold during that time. Though written so long ago, it is as useful and interesting as ever.

NOTES ON THE EARLY STAGES OF CATOCALÆ.

BY G. M. AND E. A. DODGE, LOUISIANA, MO.

Catocala Clintonii.

Egg, deposited June 21st, 1900, is a disc concave below and convex above. The ornamentation consists of a series of ridges converging from the slightly upcurved edge to a central depression which has in its centre a slight tubercle. Colour dark, or blackish. Hatched April 17, 1901.

Larvæ escaped by cutting a hole at one side of the centre above.

Newly-hatched larvæ slender, nearly $\frac{1}{4}$ inch in length, dark pruinose. Head paler, no marks apparent.

After first moult they are somewhat lighter in colour. The two rows of dorsal tubercles appear as black dots. The head is light, the lobes surmounted with black.

On the tenth day one larva was one-half inch in length, blackish, but paler than at first. Gray sagittate spots along the dorsum indicated the dorsal stripe. Tubercles small and black. Posterior dorsal part of 8th segment black, and dorsal tubercles on anal segments surrounded by black patches.

Head about same colour as body. Three days later this larva measured seven-tenths inch in length. The colour had become gray tinged with red. The usual longitudinal stripes were obsolete, but the darker patches following each of the dorsal tubercles gave the effect of indistinct interrupted subdorsal stripes.

Head quite small, slightly darker than the body, mouth-parts white. A triangular dark patch, apex downward, near summit of each lobe in front.

There were numerous light-coloured filaments. The most distinctive feature was the black band of eighth segment enclosing, centrally, a quite prominent, thick, rounded tubercle or horn, the tip of which was pale gray.

Tenth segment raised posteriorly and marked by two black dashes nearly meeting across the dorsum.

The eleventh segment was also elevated in same way, the posterior part being marked by a much curved black line bounding the raised portion posteriorly.

Head bordered behind with brown.

May 1st, newly moulted. Light gray, the dark patches of the dorsal tubercles having disappeared.

Tubercles white anteriorly and black posteriorly, markings of head as before. Band of eighth segment paler brown, except around base of central tubercle. This last, short, rounded and bent backward. Filaments white, compound, broad at the base, and dividing into about five points.

May 7th, mature larvæ. Uniform reddish gray. Head brown in front, except lower part white, each lobe surmounted by a yellowish spot. Head bordered with dark brown behind. Dorsal stripe indistinct. Tubercles inconspicuous. The dorsal horn of eighth segment is reduced to little more than an acuminate ridge, with summit slightly if at all paler than body colour. Head somewhat elevated; body much flattened. The numerous filaments seem to originate from an extension of the skin along the sides. Very slight black markings on anal segments. Began spinning up May 17th. Two pupæ. One of these is in a thin silken cocoon partially covered with sand and leaves. It measures about three-quarters of an inch in length and is pale red, the head and thoracic parts having a greenish tint. No bloom.

The second pupa is covered with a heavy bluish bloom, through which the red of the abdominal parts shows faintly. Gave imago June 4th.

This larva hatched so early that few trees had opened their buds. We gave them a mixture of everything that seemed to be available, and in each of three lots they selected plum. The larvæ, however, did not do well on plum. They ate it readily enough, and seemed to thrive, but died off from time to time until, of some fifty hatched, only about four or five made pupæ.

May 3rd a single wild larva, mature, was found under an apple tree and fed to pupation upon apple. Hence, it may be safe to infer that apple is the proper food-plant for this species.

Clintonii has for two years past been the earliest of all our *Catocalæ* specimens, having been taken June 6th or 7th in each year. Previous to that we had not collected.

Catocala minuta, Edw.

Food-plant, *Gleditschia triacanthos* (Honey locust).

Eggs deposited June 23rd, 1900, in crevice of the bark, seventy or more in a compact mass or cluster. Smooth, shining, about twice as long as broad, rounded at the ends, colourless.

Hatched April 21st, 1901.

Buds were just beginning to expand on the honey-locust trees.

Newly-hatched larvæ white, semi-translucent. A small dark spot on each side of the head. Length about three-twentieths of an inch. As soon as full fed they are green and scarcely distinguishable from the leaf upon which they rest.

April 30th they had attained a length of about two-tenths of an inch.

Colour reddish gray, narrowly striped with whitish on the sides, and with a rather broad, light dorsal stripe. Head pale gray.

May 4th, after the second moult, they appeared of a dusky green colour. Dorsal stripe white. Sub-dorsal and stigmatal stripes broad, dark and edged with white.

All the tubercles black, ringed with white at the base. Eighth segment with the usual dark band, but no protuberances. Head dark, mouth-parts white. Black cervical and anal patches.

At this point the larvæ showed much variation in colour.

One form was sooty or rusty black, darkest on sides; another was pale, whitish, without black cervical or anal patch, and transverse band of eighth segment but faintly dark.

At the succeeding moult this variation was still more pronounced, but in the majority of specimens the colour was black, with a broad yellowish dorsal stripe broken by the velvety black band of eighth segment. Sub-dorsal stripes outlined with white. Face and feet black. Sides black except on anterior upper part of eighth segment, where appeared a large oval yellow or red patch contrasting strongly with the body colour. Usually there was also a yellow patch or line across the dorsal portion of segment four.

The eighth segment had a rather high transverse ridge, and on the anal segments the dorsal tubercles were long and black.

Length at this stage three-fourths of an inch. A few whitish filaments appeared along the sides, only four or five at most to any one segment.

As the variations in colour are numerous, while the form does not materially change, a description of the mature larva will suffice and avoid repetition.

May 12th, length one and three-fourths inches. Form slim and rather long for the size. Not greatly fusiform.

Head black behind, dusky in front, with a very small light spot near top of each lobe.

Body brownish black, with a paler dorsal stripe, and broad whitish patches on dorsal surface of segment four and portions of segments seven and eight. The patch on four is usually shaped like a W, with open part forward.

Tubercles white in front, black behind, and followed by black patches, but on the anal segments the dorsal tubercles are quite large and reddish brown in colour.

Band of segments eight and nine broad and deep velvety black.

Ridge of segment eight rather high, inclined backward, and tipped with white or with white flecks on the summit.

Filaments very few, barely noticeable.

Body beneath greenish yellow, with large black spots.

By May 19th upwards of fifty of these larvæ had spun up and mostly pupated, all being the progeny of one moth.

Pupa enclosed in a rather strong silken cocoon covered with leaves, sand or whatever material was to be had.

Length of pupa about three-fourths of an inch. Slender. Only two-tenths inch wide at its widest part. Bloom rather heavy.

Gave imago June 4th.

This is a very active larva in all stages of its growth. The imago is not very common here, although we have taken a number of them, including the three forms included under *minuta* and its varieties.

Catocala Judith, Strecker; *Levettei*, Grote.

Description of mature larva taken hiding under bark on trunk of hickory.

Food-plant, hickory.

Form of body low and flat; no elevations on any segment. Length, June 1st, one and three-fourths inches. Head, wider than thoracic segments, grayish streaked with pale brown, these streaks uniting upon summit of each lobe and there forming a wider longitudinal streak.

Mouth-parts black, and from each side a black stripe runs up on the cheek about one-tenth of an inch, ending in a point.

Colour, black, closely reticulated throughout with greenish white, making the general colour appear greenish black.

Tubercles white, small, but, from the contrast of colour, very distinct. Cervical and anal plates black. No filaments.

Ventral surface greenish white, each segment marked with a dull brownish spot.

Spun up June 3rd, among leaves. Length of pupa, nine-tenths of an inch ; width, five-twentieths.

Colour, pale reddish, with a thin whitish bloom.

Gave imago June 24th.

The larvæ of this species is rarely found except hidden under the loose scales of bark on the trunks of hickory trees. Later the imago may often be found also hidden under bark.

Like many *Catocalæ*, it is quite common some years, but such a season may be followed by years of scarcity.

It appears to be but little subject to variation. We have not seen the form *miranda*, Hy. Edw., here, and would like to correspond with any one who takes it.

Catocala obscura, Strk.

Larva taken under bark of shell-bark hickory, May 12th, 1901. Food-plant, hickory. Length at maturity, two and one-half inches.

Description of mature larva : Colour, dusky gray. Head broad, but not high, whitish with pale brown markings and a small, ill-defined black blotch at corners of mouth.

The dorsal stripe is interrupted on fourth to ninth segment, inclusive, by black, curved patches that occupy the space between the dorsal tubercles, and opening backward, enclose white, cone-shaped patches, apex forward and truncate behind. Tubercles small and white ; no filaments. There is no elevation and no dark band on segment eight. Segment eleven is slightly raised and bordered behind with black ; legs pale greenish, marked with some blackish spots.

Below greenish white with large black spots, except on thoracic segments and segments eight and nine.

Pupa : length, half an inch ; width, about three-tenths of an inch.

Colour, pale red with a thin bloom.

Imago, July 2nd.

Catocala epione, Dru.

Larva taken under loose bark on hickory. Food-plant, hickory.

May 19th, mature larva ; length, two and two-tenths inches. Colour, pruinose. Head narrower than following segment ; brown, with a black stripe over the top and down each side to the mouth, with a vertical spur between the lobes. The dorsal stripe is composed of four, or two pairs of, wavy white lines which coalesce on the posterior segments, a similar series of white lines also ornamenting the side, and a double, white sub-ventral line.

The tubercles are small and scarcely discernible except on anal segments, where they are outlined with black. There is a dark stripe along the spiracles, which are black. No filaments. Ventral surface pink, with all the spots black and conspicuous.

May 20th, spun up. Pupa: length, one and one-tenth inches; width, three-tenths inch. Gave imago June 19th.

Catocala habilis, Grt.

Larva taken early in June, under loose bark on hickory. Food-plant, hickory.

June 16th. Length, two and two-tenths inches. Colour, greenish black; very smooth and glossy. Head wider than first segment, pale, with slight brown markings, and with a broad, irregular, black stripe from mouth to top of lobes. The dorsal stripe scarcely paler than the general colour. Tubercles whitish, minute. No ridge or prominence and no transverse band. No filaments.

A very black stigmatal stripe, distinct to the extremities, forms a sharp line of demarcation between the blackish colour above and the greenish gray of the sub-stigmatal region. Ventral surface greenish white, with dusky spots on the central segments only. Spun up June 22nd. Gave imago July 12th, 1901. The larvæ of *habilis* and *Judith* are very similar in appearance and habits, but may be readily distinguished from each other by the black stigmatal stripe and black marks on the head of the former. Occasional larvæ are much paler in general colour, but retain these distinctive markings.

A NEW VARIETY OF *CICINDELA VULGARIS*.

BY EDWARD DOUBLEDAY HARRIS, NEW YORK.

A undescribed variety of *Cicindela vulgaris*, Say, is reported from the basin of the Rogue River, in S.-W. Oregon. Twenty specimens taken during the month of April of this year, and closely representative of the local tribe, present no differences except a slight one in shade of colour, indicating, apparently, that the variety is well established and worthy of a descriptive name. The elytra markings are identical with those generally recognized as possessed by *vulgaris* proper. It is slightly narrower and the upper surface more convex than the type. The colour is a dull coppery green, the metallic hue being more apparent, as is usual in other species, at the edges of the elytra. It seems to be a connecting link between the type and variety *vibex*, Horn. Its habitat suggests the name *C. roguensis*.

A NEW GOOSEBERRY PLANT-LOUSE.

BY W. P. AND T. D. A. COCKERELL.

Myzus Neomexicanus, n. sp.—*Winged form*. General colour of head and thorax black; prothorax sage-green with a transverse black shield, narrowest in the middle; sides of thorax green; antennæ black; wings clear, stigma and nervures very dark brown; abdomen sage-green, four quadrate black marks on each side anterior to honey-tubes, the last sometimes a mere speck; honey-tubes blackish, darkest basally; segment bearing honey-tubes with a few black spots, this and the following two segments with transverse black bands; legs black, tibiæ brown. Ocelliferous tubercle prominent; frontal tubercles low and broad, these and first antennal joint very slightly gibbous. Honey-tubes not swollen, 300μ long and 40 broad, 200μ short of tip of abdomen, cingulate. Body about 2100μ long, antennæ about 1030, half length of body. Tibia of anterior leg 700, of hind leg 880μ . Antennal joints (counting the so-called 7th joint as 6b) measuring: (1) 70, (2) 60, (3) 270, (4) 190, (5) 184, (6a) 100, (6b) 270.

Apterous ♀. Clear apple-green (turns yellow in balsam), head and thorax lighter; eyes black; legs, antennæ and honey-tubes yellowish-green like head; fifth and sixth joints of antennæ and tip of honey-tubes dusky; rostrum extending to middle coxæ; lateral tubercles at sides of prothorax (also in winged form), in region of hind legs, and posterior to nectaries, six (three pairs) pointed tubercles in all; cauda elongate, with rounded, sparsely hairy tip; legs long, hind tibiæ bristly. *No capitate hairs*. Very young specimens have red eyes.

Body (adult) about 2430μ long, antennæ about 1000; honey-tubes 380 long, 50 broad, the tips level with basal part of cauda; tibia of anterior leg 700, of hind leg 940. Antennal joints: (1) 70, (2) 60, (3) 250, (4) 190, (5) 184, (6a) 100, (6b) 230.

Hab.—On wild gooseberry (*Ribes*, probably *R. leptanthum*) in an arroyo about five miles S.-W. of Las Vegas, New Mexico. Abundant at ends of twigs, June 2, 1901; not curling leaves. Attended by *Lasius*. Noticeable for the short antennæ, three pairs of lateral tubercles, and lack of capitate hairs. It is similar in many respects to *M. ribis* and its allies, but evidently distinct. From *M. ribis* proper it differs by the green apterous ♀ without capitate hairs and without a dorsal quadrate mark; from *M. ribis trifasciata* by similar characters, though the coloration of the winged forms is more similar; from *M. ribis Bucktonii* by the

absence of capitate hairs, and abdominal markings of winged ♀; from *M. Targionii* (which it resembles in not curling the leaves) by the character of the markings. It is evidently a native species (it occurs far from any gardens), and we may expect that it will attack cultivated gooseberries and currants as soon as it gets a chance. The allied forms cited above, already known as garden pests, are natives of Europe, though the first has been introduced into America.

We take this opportunity to record *Rhopalosiphum violæ*, Pergande, on house violets in Las Vegas, N. M.; it has not before been reported from New Mexico.

SOME OBSERVATIONS ON THE DEVELOPMENT OF FENISECA TARQUINIUS, FAB.

BY A. I. GOOD, WOOSTER, OHIO.

On October 27, 1900, while walking through some woods along a creek near Wooster, Ohio, my attention was drawn to some white masses on Black Alder (*Ilex verticillata*, Gray). These masses proved to be plant lice covered with a white down. A couple of branches were broken off and taken home. There were found among these masses of lice, and concealed by them, several small, slug-like larvæ about .75 inch in length. The lice, through the kindness of Prof. F. M. Webster, were identified as *Schizoneura tessellata*, Fitch.

The larvæ in a few days became restless, as if wishing to pupate, and on being given a suitable place, soon fastened themselves up, and within a day or two passed into the pupal stage; then we knew that we had the curious monkey-faced pupæ of the little butterfly, *Feniseca tarquinius*. In all, six of these pupæ were obtained, but owing to unfavorable conditions only three of them developed to adults. Other larvæ were found about the first of November, but owing to severe cold weather the majority had perished. Some of these last larvæ were not fully grown, and could hardly have belonged to the first brood.

The strange part is, that to all appearances the food of the larvæ consisted of these lice. The butterfly is not common in this locality, and this is the only time that I have taken it in any form. The larvæ have somewhat the appearance of those of some of the Lady Beetles.

I well remember when with my father, Rev. A. C. Good, we first found the larvæ and pupæ of *Spalgis s-signata*, Holland, in West Africa, and despite their unusual appearance, the larvæ found near Wooster strangely recalled to my mind those of the West African species, though it was not until my Ohio larvæ pupated that I felt sure of their identity.

SOME NEW OR LITTLE-KNOWN BEES.

BY CHARLES ROBERTSON, CARLINVILLE, ILL.

Andrena krigiana, n. sp.

♀.—Black; mandibles rufous at tips, toothed near the apex; basal process of labrum short, subquadrate, emarginate; clypeus somewhat shining towards apex, where it is rather distinctly punctured, elsewhere opaque and reticulated; face before ocelli longitudinally striate; facial foveæ quite short, not descending below insertion of antennæ, filled with a fine pubescence which appears black; antennæ short, joint 3 as long as the next three together, or nearly so, apical joints dull testaceous beneath; thorax throughout opaque and finely reticulated; enclosure of metathorax poorly defined, but rather strongly rugose; pubescence of head and thorax rather thin and dull fulvous; wings subhyaline, nervures and stigma honey-yellow, second cubital cell about one-third as long as the third, oblique, receiving the first recurrent nervure at, or a little before, or a little beyond, the middle; abdomen shining, rather sparsely and rather evenly punctured, apical margins of segments pale testaceous, hardly subfasciate, fimbria fulvous; scopæ pale, the hairs of hind tibiæ rather strongly plumose. Length, 8 mm.

♂.—Resembles the female; the face before ocelli not striate; clypeus with a large trilobed yellow spot. Length, 8 mm.

Carlinville, Illinois; 13 ♀, 1 ♂ specimen.

Paralictus, n. g.

This is proposed as a new genus for the reception of *Halictus cephalicus*, Rob., as the type, and *H. platyparius*, Rob., and the following species as congeners:

The venation, proboscis, hind spurs and general characters are the same as in the small, dull greenish species of *Halictus*. The cheeks are broad, mandibles simple; labrum concave, not produced, terminal lobe not produced to a laterally compressed, strongly pectinate point, but broad and flat, more as in *Sphecodes*; anal rims and scopæ obsolete, or nearly so, quite different from *Halictus*. Of ten female specimens, none have any pollen in their meagre scopæ, and I am quite certain that these females do not collect any pollen. I captured both sexes of *P. cephalicus* at a bank filled with nests of *Halictus sphyrus*, and I suspect that this species is an inquiline of that *Halictus*.

Paralictus simplex, n. sp.

♀.—Closely resembles *P. platyparius*, Rob., but may be readily distinguished by the cheeks being broad and rounded, not produced to an obtuse angle as in that species.

Carlinville, Illinois; 3 ♀ specimens.

Halictus truncatus, n. sp.

Halictus similis, Robertson, Trans. Am. Ent. Soc., 22: 145, ♀, 1893.

Halictus similis, Robertson, Trans. Acad. Sci., St. Louis, 10: 52, ♂, 1900.

This species and *H. arcuatus*, Rob., have both been identified as *H. similis*, Sm. It is doubtful to which one that name applies, or whether it applies to either of them.

Melissodes cnici, n. sp.

? *Melissodes desponsa*, Smith, B. M. Cat. Hym., 2: 310, ♀, 1854.

Melissodes nigripes, Smith, ibid. 311, ♂ (not ♀).

Melissodes desponsa, Robertson, Trans. Acad. Sci., St. Louis, 7: 354, ♀, 1897.

This is an oligotropic visitor of thistles. It is abundant on the flowers, the female getting her pollen exclusively from them. Two males taken on *Monarda fistulosa* are the only specimens of this species taken on any other flowers.

Melissodes dentiventris, Sm.

? *Macrocera Americana*, Lepeletier, Hist. Ins. Hym., 2: 92, ♂, 1841.

? *Melissodes obliqua*, Smith, B. M. Cat. Hym., 2: 310, ♀, 1854.

Melissodes dentiventris, Smith, ibid., 212, ♂.

Melissodes dentiventris, Robertson, Trans. Acad. Sci., St. Louis, 7: 353, ♀, 1897.

This was identified for me by Mr. Cresson as *M. obliqua*, Sm., and is about as likely to prove to be the true *M. obliqua* as the preceding is. Specimens which are a little faded and in which the oblique fasciæ of abdomen are not evident would readily be identified as that species. The preceding, being an almost exclusive visitor of thistles, is more likely to be overlooked. *M. dentiventris* has been taken on the flowers of sixteen species of nine different genera. The determination of *M. Americana* is too doubtful to justify its use.

Melissodes trinodis, n. sp.

Melissodes Pennsylvanica, Robertson, Trans. Acad. Sci., St. Louis, 7: 355, ♀ ♂, 1897.

Besides the characters mentioned in the place cited, which distinguish this species from *M. agilis*, Cr., the maxillary palpi may be mentioned. Eighty-two per cent. of my specimens have the maxillary palpi three-jointed, while in the others the fourth joint is very minute. On the other hand, eighty-four per cent. of my specimens of *M. agilis* have the maxillary palpi four-jointed.

This species has been identified as *M. dentiventris*, Sm., and I have called it *M. Pennsylvanica*. Cresson thought his *M. aurigenia* might be the same as *M. Pennsylvanica*, Lep., which is quite as likely.

Epeolus, Latr.

The maxillary palpi are two-jointed, but with only one free joint, so that it appears one-jointed. To this belong *E. bifasciatus*, Cr.; *zonatus*, Sm.; *compactus*, Cr.; *pusillus*, Cr.; *interruptus*, Rob., and the following. It is my opinion that these insects are inquilines of *Colletes*, as in the case of the European *E. variegata*.

Epeolus lectoides, n. sp.

♀.—Closely resembles *E. lectus*, Cr., and may be the same, but it is smaller, the mandibles, tubercles and tips of scutellar spines, ferruginous; tibial spurs ferruginous, not black; abdomen not strongly punctured, apex of segment 5 with a subtriangular, silvery cinereous patch; last ventral segment black. Length, 9 mm.

Carlinville, Illinois; 1 ♀ specimen.

Triepeolus, n. g.

The maxillary palpi three-jointed, with two evident free joints. To this belong *E. concavus*, Cr. (type); *remigatus*, F.; *nevadensis*, Cr.; *lunatus*, Say; *donatus*, Sm.; *Cressonii*, Rob.; *helianthi*, Rob.; *pectoralis*, Rob. I think that these insects are inquilines of Melissodinæ, as Mr. Ashmead has already observed in the case of *E. donatus* and *Eutechnia taurea*.

Chelostomoides, n. g.

This is proposed as a new genus for the reception of *Megachile rufimanus*, Rob. It has the general characters of *Megachile*, apical joint of maxillary palpi quite long, hairy; in female the clypeal region is excavated, the mandibles long, narrow, tridentate.

ACRONYCTA AND TYPES.

BY JOHN B. SMITH, SC. D., RUTGERS COLLEGE, NEW BRUNSWICK, N. J.

In his note on p. 191, Dr. Dyar raises an interesting question, concerning which I would like a general expression of opinion for my own guidance.

Among the material received for study by M. Guenée from the British Museum, perhaps also from other sources, was a considerable number of specimens and drawings collected, bred or drawn by John Abbott, of Georgia.

Not all of the Abbott drawings went to the British Museum, for I saw some in Paris ten years ago, and not all the Abbott drawings have been identified, for I saw in the British Museum many pictures representing insects that have not been taken since, so far as I know, while I identified a few recently described, among these century-old drawings.

It was Abbott's practice to draw and paint the species bred by him, so as to show the stages and the food-plant on one card; but he also made separate drawings of a great many specimens concerning whose early stages he knew nothing.

The originals of his drawings are not always represented by existing specimens. I do not know whether there ever was a definite association between an individual received in Europe and any one drawing.

At all events, Guenée received specimens and drawings, and he made very free use of the drawings, especially in his descriptions of early stages. He always cites such cases as "decrit sur un dessin par Abbott." He does not always say that the adult described by him also came from Abbott or what evidence he had that larva and adult were correctly associated.

In some cases he had no adults at all, and his descriptions are avowedly from the pictures only. Some of these pictures I have failed to find, but they may be still in existence.

Question 1.—What standing has a specific name avowedly based on a drawing made by another, the original of which the describer has never seen and which may or may not be then in existence?

My own strong impression was, that as such descriptions never had a type—that is, were not made from an actual specimen—they should be ignored. Yet, my practice has not been in accordance with this, and there is now at least one species of North American Noctuids listed which is utterly unknown in nature to any living entomologist. The

description of the adult is not bad, and the description of the larva is so good as to make it certain that if it is ever found on the given food-plant, its identification will be reasonably satisfactory.

Several other species have been so identified, and the names are in common use.

Concerning the species of *Acronycta*, it is certain that Guenée has mixed things, and he may have done so in two or three different ways. If the drawings of the adult and larva were not on the same sheet, he may have changed the association, or it may have been changed before it got into his hands. If there was an adult from Abbott, it may not have been the specimen actually bred, but one associated with it as a form or variety. In those early days variation had a wider range, and it is not incredible that "*hamamelis*" and "*afflicta*" might have been considered the same, specifically. Finally—and this I consider the most probable—Guenée actually described his species from Abbott's drawings, but incorrectly identified the examples before him with the drawing from which he had just made his description. He does not say this, however, but alleges specimens in existence.

Question 2.—Under the circumstances, shall the specimens referred to by Guenée and labeled by him be considered as the types, or shall the description of the larva determine the species intended?

Personally, I have decided to accept the labeled adult as representing the species, though I have no doubt that the association of adult and larva was due to a mix-up, and was an error. The adult was first described; the error is in applying the larval description.

Finally, it is, of course, a serious deprivation to be without a sense of humour, but at the risk of losing all reputation in that direction, I must yet confess an utter inability to see anything funny in Dr. Dyar's original note concerning types. He says the suggestion that the type be now destroyed was a joke. He must know, of course, and therefore my remarks, based on an ignorance of that fact, have lost their point and must be withdrawn. I have no apology to make, for they were fully justified by the literal meaning of the expression criticised by me.

There are altogether too many of my own types in the U. S. National Museum to make the matter anything but a serious one to me, and I have too much other material that I expect to send there to make such remarks a matter of indifference.

I will say, however, in justice to Dr. Dyar and to myself, that I did not really believe that he would actually or in any way neglect or allow harm to come to any of the types or other material in his custody in the U. S. National Museum, or would carry out the natural inference to be drawn from his words. I had too much regard for and confidence in him as a man to believe that ; but I did believe that he gave expression to a conviction that the importance of types had been overrated, and that nomenclature would be more stable were there none to be referred to. In which, after all, he may be right.

THE EFFECTS OF SCORPION VENOM.

BY O. W. BARRETT, CLARENDON, VERMONT.

The prevailing belief in regard to scorpion stings seems to be correct : dangerous, but seldom fatal.

However, there are scorpions *and* scorpions. Moreover, much depends upon the season and the part stung. Generally speaking, a sting in the dry season is much worse than one in the rainy season, because the venom becomes concentrated during the period of lesser activity. And for obvious reasons a sting in the head, neck or trunk of body is worse than one in the extremities.

In Mexico the brownish-black species (*Vejovis crassimanus*, Pock.; *V. mexicanus*, Koch, and others) which passes under the name of "alacran prieto" is comparatively harmless ; it prefers a moist habitat and is "slow to anger." But the larger brownish-yellow species (*Centrurus*, sp.) called "alacran huero" are perhaps the most poisonous Arthropods in the world.

Having experienced the full effect of the dry-season venom of a large "huero" (as well as that of other species), I am able to give evidence that is not of the "hear-say" kind.

The pain from the sting is local and very intense for five to ten minutes, until the life of the adjacent nerves is simply killed out. As the ptomaine-like poison spreads into the tissues the involuntary movements and cramps of affected muscles begin. In about half an hour the nearest lymphatics become very painful, and the action of the poison can be felt throughout the system. Then, especially if the sting be in the upper extremities, a period of sneezing begins, and may last an hour or more. This is a reflex action from the cervical ganglia, the functions of which have been deranged by the rapid absorption of the poison into the

lymphatics. The throat feels as if there were a wad of cotton in the fauces, and thirst is satisfied only with great difficulty, since the act of swallowing is accompanied with pain and a "scary," prickling sensation in the pharynx.

After two or three hours the acute pain subsides gradually, but the intense soreness of the flesh near the part stung and the more or less complete paralysis of the muscles and throat continues, and may last for days. Strong heart action is needed to carry the victim past the sixth hour if the sting be a bad one. Death among children and weak persons results apparently from paralysis of the thoracic muscles. Artificial respiration and heart stimulants may be necessary at the crisis.

The secondary symptoms are quite unpleasant, if not dangerous. The membranes of the pharynx become deeply affected, and seem to crack open and slough off, with the result that small ulcers and pus patches appear on the second or third day, and may give trouble for a week. Fever develops within twelve to twenty-four hours, and lasts several days, according to conditions. It is the type of fever which usually follows any great lymphatic disturbance, but it is likely to arouse any latent malaria which the system may contain.

Death from scorpion stings is common among children under six years of age in the Mexican States of Durango and Guerrero. On account of the very many fatal cases in the City of Durango, the authorities have placed a bounty on the tails [sic] of scorpions killed therein.

The whip scorpion (*Mastigoproctus giganteus*), or "vinaigrillo" [so called from its strong odour of vinegar], lives under stones and in loose soil, and is nocturnal in habit. The sting is a straight spine situated near the base of each "jaw," and thus the victim is very likely to get *two* doses at once of a venom which is said to be more powerful than that of the true scorpion. At Cuernavaca I was told of a field labourer who was found dead, but *sitting bolt upright*, so great had been the nervous shock and muscular cramping from a "vinaigrillo" sting.

Wherefore, if might be right, the scorpion is "O K."

It is with deep regret that we announce the death of our esteemed friend, MISS ELEANOR A. ORMEROD, which took place at her residence, St. Albans, England, on Friday, July 19th. Owing to her advancing years and failing health, she had recently given up her work in economic entomology. We hope on a future occasion to give some account of her life and the practical and scientific work that she accomplished.

A NEW XIPHIDIUM FROM FLORIDA.

BY A. P. MORSE, WELLESLEY, MASS.

Xiphidium gracillimum, sp. nov.—Very slender. Brown above, face and sides greenish, wing veins purple; a conspicuous dark brown mid-dorsal stripe on the head and pronotum, bordered by broad pale bands, sometimes with dusky or purplish markings on the cheeks, sides of pronotum and middle of face. Antennæ brown, extremely long and slender. Eyes very prominent, in side view circular in outline. Fastigium of the vertex ascending, strongly advanced (about the length of the eye seen from above), very narrow (about one-fourth the distance between the eyes), its sides parallel or slightly convergent. Lateral lobes of the pronotum usually triangular in outline by the exceptional reduction of the anterior ventral angle and the straightening of the posterior margin, which forms a line with the hind margin of the posterior process, the humeral sinus distinct but shallow.

Anterior tibiæ with 5 or 6 pairs of spines. Hind femora slender, unspined below, the genicular lobes spined. Sub-genital plate of male truncate; cerci slender, the internal tooth broad at base, slender and acuminate at tip, the apical portion of the cercus elongate, two or two and a half times as long as wide, with the distal half strongly depressed and tapering to a narrow, rounded point, its sides a little sinuous, sub-parallel. Ovipositor of female straight, about two-thirds as long as the hind femora, and barely passing their tips, slightly widened in the middle portion, tapering evenly to an acute point, with the ventral margin a little more convex than the dorsal.

Antenna: ♂, 40-58; ♀, —. Body: ♂, 12-14; ♀, 15. Post. fem.: ♂, 10.5-12; ♀, 13. Teg.: ♂, 14.5-17; ♀, 18.5. Ovip.: 8. Cerci of ♂, 1.5. Total (vertex to tip of wings): ♂, 21.5-25; ♀, 27 mm.

One ♂, April 4, Capron, Fla. Four ♂, one ♀, Biscayne Bay, Fla., Mrs. A. T. Slosson. All from the collection of Mr. S. H. Scudder.

MONTREAL BRANCH, Entomological Society of Ontario.—At the recent annual meeting the following have been elected officers for the ensuing year:

President—G. Chagnon.

Vice-President—C. Stevenson.

Librarian and Curator—A. E. Norris.

Treasurer and Secretary—George A. Moore, 24 Lorne Ave., Montreal.

Council—Henry H. Lyman, A. F. Winn, Dwight Brainerd.

PYRAMEIS CARDUI.

SIR,—Never since I first came to this country in 1893 have I seen any species of butterfly in such abundance as *Pyrameis cardui* is at the present time. During 1893, 1894 and 1895 I don't think I saw a single specimen, though these years seemed particularly favourable to most species. For the past year or two it has been rather common, and I have frequently found the larva on thistle during June. Locally-bred specimens were rather more common than usual last fall, and the same brood (presumably) appeared here with early spring. On May 12th I remarked upon their scarcity, and supposed they had died off, but for the last week they have been getting gradually more numerous, and to-day their numbers appear to have suddenly doubled, if not trebled. I believe I could net a thousand in a day without much difficulty. They do not seem to be travelling in any particular direction, but are evidently a "flight," probably from the South. I have watched the ♀♀ settling on a variety of seedling plants, presumably ovipositing, and in one instance found an egg on sage, and apparently no thistles near.

May 25, 1901.

F. H. WOLLEY DOD, Calgary, Alberta.

BOOK NOTICES.

MONOGRAPH OF THE SESIIDÆ OF AMERICA, North of Mexico.—By William Beutenmüller. Memoirs of the American Museum of Natural History, New York. Vol. I., Part vi., pp. 215-352. March, 1901. (Price, \$5.)

In this sumptuous quarto the author has brought together in complete form the results of his studies of the Clear-winged Moths of North America. In arrangement, style and completeness, the work leaves nothing to be desired. The family is divided into 17 genera, each of which is fully characterized and illustrated by a drawing showing the head, hind leg, venation, and in some cases the anal appendages, of a typical species. With each species is given a very full bibliography as well as descriptions of both sexes and the larva, when known, followed by general notes mentioning resemblances to other species, particulars regarding habits, food-plants, distribution, etc. There are also synopses of genera and species, larval food-habits and of the described larvæ, rendering the work easily available for reference and the identification of species. The work

concludes with an amazing bibliography which fills thirty-six pages and includes 542 titles. This by itself would show the industry and thoroughness of the author and the pains he has taken to render his monograph as perfect and complete as possible. Besides the four and twenty carefully-drawn wood-cuts already referred to, the work is illustrated with eight splendid coloured lithographic plates, on five of which are depicted about 130 figures of the perfect moths, and on the remaining three, specimens of the destructive work of the larvæ in the trunks, limbs and roots of trees and other plants. We heartily congratulate the author on the successful completion of this grand work, and hope that he may be able from time to time to present to the scientific world similar volumes dealing with other groups and families of moths, many of which sorely need the careful revision of a competent monographer. C. J. S. B.

THE INSECT BOOK: A popular account of the Bees, Wasps, Ants, Grasshoppers, Flies and other North American Insects, exclusive of the Butterflies, Moths and Beetles, with full life-histories, tables and bibliographies.—By Leland O. Howard, Ph. D. New York: Doubleday, Page & Co., 34 Union Square. One Vol., small 4to., pp. xxvii. + 429. (Price, \$3 net.)

Only last month we noticed Dr. Howard's book on Mosquitoes, and now we have before us a larger and more important work by the same author. It forms one of the series of "Nature Study" books, and is consequently uniform in size and style with Dr. Holland's "The Butterfly Book." The author describes in the title the scope and intention of the work. He does not profess to cover the whole insect world, as Dr. Holland is preparing to deal with the Moths as he has already done with the Butterflies, and Dr. Howard looks to someone else to undertake a popular work on the extensive order of Beetles.

As stated at the outset, the book is meant to be "popular," and therefore does not attempt the impossible task of describing all the insects belonging to the various orders treated of; at the same time, it does give full and interesting accounts of a very large number of species, and relates in an easy and agreeable manner all that the ordinary enquirer will wish to know. Any observant person who picks up an insect that he has not seen before, and wonders what it is and how it lives, will find an answer to his questions here. In most cases he will find an accurate picture of the specimen he is examining, and with very little trouble he will learn all he

wants to know. It is a book that will charm the young people, who are usually such keen-eyed naturalists; it will delight the collector of insects who is beginning the hard study of entomology; and it will be found of daily use by those who apply themselves to the pursuit of the economic side of the science, and who therefore require to know something about all sorts and conditions of insect life. We bespeak for it a wide circulation, and we hope that it will lead many a student and collector to devote himself to the less popular orders of insects, now that his way is made so much easier and he has such an effective help for the identification and classification of his specimens.

The volume is illustrated with 48 plates from photographs of the insects themselves. Twelve of these are coloured, and they are all so clear and so beautifully printed that they can be examined with a magnifying glass in order to observe the details. There are also 264 illustrations in the text, some, of course, familiar, but many new, and all well and carefully drawn. We are especially pleased to notice that the figures on the plates are clearly numbered in regular order, so that there is no need of hunting over the page to find a number wanted, and the list of names faces the picture and saves the necessity of turning over a page to discover the titles of the insects depicted.

C. J. S. B.

NATURE BIOGRAPHIES: The lives of some everyday Butterflies, Moths, Grasshoppers and Flies.—By Clarence Moores Weed, D. Sc. New York: Doubleday, Page & Co. One Vol., pp. 164. (Price, \$1.50 net.)

We are glad that Dr. Weed has brought together in book form this series of studies of insect life and has illustrated them so fully and so beautifully with his own exquisite photographs. Some of them we read originally in the pages of newspapers, where they could not be illustrated, but they were nevertheless full of charm and interest. Now that they are published together, and have 150 of the most clear and perfect photographic illustrations that we have ever seen to illuminate them, we are sure that nature-lovers will read them with supreme delight. There are fourteen of these studies—too many to enumerate here, but we may mention particularly those entitled: The Making of a Butterfly, The American Tent-Caterpillar, The Camera and the Entomologist, and

Insects in Winter. Not that these are more noteworthy than the rest, but they will serve to give an indication of the contents of the work.

Dr. Weed's "Stories of Insect Life" have been much appreciated, and we are sure that his "Nature Biographies" will be still more enjoyed, and will lead many, old as well as young, to observe for themselves some of the wonders of the insect world—some of the marvels that every day surround us.

C. J. S. B.

Mr. P. Wytsman (108 Boulevard du Nord, Brussels, Belgium) has issued the prospectus of a proposed elaborate and important work, viz., "Genera Insectorum" of the world. It is to be issued, provided one hundred subscribers can be secured, in quarto parts, each containing about 72 pages of text, and 7 plain or coloured plates. The price of each part will be five dollars, and it is expected that 75 parts will be required to complete the work. It is hoped that well-endowed libraries, both in Europe and America, will render the publication practicable; it is far beyond the means of all but very few individuals.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.—The annual meeting will be held at Denver, Colorado, August 24th to 31st, where it is expected that there will be a large attendance of members from all parts of the continent.

The thirteenth annual meeting of the Association of Economic Entomologists will be held at the same place, beginning at 10 a.m. on Friday, August 23rd.

The editor desires to thank some unknown correspondents for sending him (1) a pair of *Attacus promethea* and cocoon, and (2) a specimen of the rare Sphinx moth, *Triptogon modesta*. He would remind correspondents that it is in all cases desirable to place upon the outside of a package the name and address of the sender, as postmarks are frequently illegible, and it is not always possible to identify handwriting.

LOCUSTS IN FRANCE.—An English newspaper correspondent relates that these pests have been damaging vines, clover and oats in several departments. Owing to the invasion of the locusts, the Government has directed a committee of scientific agriculturists to meet at Arles for the purpose of concerting measures to keep off the plague from the infested districts. The place which has most suffered is the marshy and unhealthy district in the Bouches-du-Rhone, known as the Camargue.

Mailed August 3rd, 1901.

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EDITED BY

REV. C. J. S. BETHUNE,

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EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

A NEARLY complete set of U. S. Agricultural Reports for exchange for some works on Entomology not in my library. Please make offer. GEORGE B. KING, Lawrence, Mass.

LEPIDOPTERA.—Would like to receive duplicate lists of collectors in every State. Rhopalocera especially desired. JOHN & HURD COMSTOCK, 1572 Ridge Ave., Evanston, Illinois.

DIURNALS, LEPIDOPTERA.—Will exchange French butterflies, in paper, for butterflies of U. S. A. and Canada. Please send lists. PROF. J. B. A. L. LEYMARIE, 25 Boyer Lane, near Rachel Street, Montreal, P. Q.

CICINDELIDÆ.—Wanted (Henshaw's List) Nos. 196, 20, 23, 25d, 25g, 25h, 34b, 37, 48, 49, 50, 56. For *C. Willistoni* and *C. tenuicincta* write for terms.—W. KNAUS, McPherson, Kansas.

WANTED.—Insect Life, Vol. II., Nos. 1, 2, 9; Vol. IV., Nos. 7, 8, 9, 11; and Bulletins 1 to 4 of Cornell Exp. Station. Will give double exchange for same. WILMON NEWELL, Wooster, Ohio.

WILL COLLECT this season all orders (except Lepidoptera) in the fertile North Valley hill region of Chester County, in exchange for Phytophagous Hymenoptera and Evaniidæ, or other Ichneumonoidea. J. CHESTER BRADLEY, 2221 Spring Garden St., Philadelphia, Pa.

BRITISH GUIANA.—The advertiser is now collecting insects in Guiana. Would like to hear from anyone requiring good specimens from there. R. J. CREW, Georgetown P. O., Demerara, S. A.

DIURNAL LEPIDOPTERA wanted from the W. and N.-W. States for diurnals from Central and northern South America. LEVI W. MENGEL, Boys' High School, Reading, Pa.

ACULEATE HYMENOPTERA, especially Apoidea, wanted. Will give good exchange in Coleoptera or Hymenoptera. E. S. G. TITUS, Urbana, Ill.

LEPIDOPTERA: Sphingidæ, Arctiidæ and Saturniidæ of the world desired in exchange. Liberal exchange given. HENRY ENGEL, Box 369, Pittsburg, Pa., U. S. A.

WANTED.—Cicindelidæ, Carabidæ, and rare Scarabæidæ. Will give good exchange in Exotic and rare European Coleoptera (named), also Odonata and Hymenoptera from N. America. Send list to R. J. WEITH, Elkhart, Indiana.

DIPTERA wanted from Washington and British Columbia in exchange for North American Coleoptera. W. S. HUNTINGTON, 1910 N. Twenty-first St., Philadelphia.

PAPILIOS brevicauda, nitra, Oregonia, indra, female, nezahualcoyott wanted; also Cicindelidæ, Cychrus, Carabus and Calosoma. Will give liberally in exchange. GEO. A. EHRLMAN, 2314 Sarah Street, Pittsburg, Penna.

LEPIDOPTERA.—I have a large number of both mounted and papered specimens for exchange. All are 1900 captures. Correspondence in both English and German. Address: A. KWIAT, 701 Larrabee St., Chicago, Illinois, U.S.A.

LEPIDOPTERA, in papers, of Canada and U. S. A., wanted in good exchange for fine Lepidoptera of Europe, Asia, South America. I take only first-class quality. Please to write Smith's number upon the paper. WILHELM NEUBURGER, Lepidopterist, Berlin, S. 42, Luisen-Ufer 45, Germany.

COLEOPTERA.—Will exchange Canadian Coleoptera, in papers, for Coleoptera of U. S. and Canada. Please send lists. C. J. OUELLET, Deaf and Dumb Inst., Ville St. Louis, Montreal, P. Q.

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LONDON, OCTOBER, 1901.

No. 10

NEW DIURNAL LEPIDOPTERA FROM BOLIVIA.

BY A. G. WEEKS, JR., BOSTON, MASS.

Papilio Cochabamba, sp. nov.

Habitat: Bolivia. Expanse, 4.00 inches.

Front of head dark, greenish black. Between the eyes, two dots of greenish white, and another dot at "collar," followed by two more similar dots on front of thorax. Antennæ, greenish black, extreme point slightly brownish. Thorax, above, dark greenish black; beneath, black with a large yellowish spot at base of costal nervule, another also at base of costal nervule of hind wing, both with a small white dot above them. Legs, black above; beneath, whitish, the white extending on to thorax as a dash.

Abdomen above, greenish cream colour (very prominent), black tip. Below, black with a white spot at base of each segment on both sides. Between these spots and the cream colour of upper part, are a series of yellowish dashes.

Fore wings above, greenish black, but with a decided greenish lustre covering outer half. The interspaces at hind margin edged with white.

Hind wings of same ground colour, the greenish lustre being somewhat brighter and more prominent. Covering nearly the whole of the subcostal space is a large dash of greenish white, followed by a row of similar, although smaller, spots or dashes extending in a *straight line*, from apex to anal angle, each about one-eighth inch wide and one-eighth inch long, diminishing in size towards anal angle. These are about one-third inch from hind margin, not touching, however, the discoidal space, and form the only prominent marking of the insect. The hind margin is strongly dentated with interspaces bordered by a white line.

Under side of fore wings: black, shading into gray black at a line drawn from inner angle across the wing towards outer part of discoidal cell. In the three lower interspaces, one-fourth inch from hind margin is a patch of whitish scales, suggestive of spots.

Under side of hind wings is entirely of bronze colour, somewhat lustrous, excepting at the top portion of each interspace, where there is a whitish spot, and inside of that, one-sixteenth inch from margin, a semicircle of brick colour, very prominent. The dentations of the wing bear the white linear border appearing on upper side.

The specimens in my possession were taken some two hundred miles north from Cochabamba. In general appearance, it resembles closely *Papilio Numitor*, Cram., and that group, and may be a climatic variation of it, but in *Numitor* the greenish-white dashes on hind wing follow more closely the contour of the hind margin, while in this these dashes are more in line with a line drawn from apex to anal angle. My specimens are invariable, showing no difference in the suffusion or size of dashes.

Dynamine albidula, sp. nov.

Habitat: Bolivia, near Sicasica. Expanse, 1.25 inches.

Head, palpi, thorax and abdomen above, blackish with gray hairs; beneath, nearly white. Antennæ, black with white annulations at the base of each joint. Club, tipped with tawny. Legs, white.

The lower portion of the fore wing is white, from a line drawn from a point close to the base on inner margin, and extending upwards to and along the median nervure to end of discoidal space, then curving downwards to lower angle, meeting inner margin one-sixteenth inch from angle. The rest of the wing is black with white spots. The discoidal space is heavily dusted with lustrous greenish-blue scales. In the centre of the space is a small white spot. Midway between apex and base is a large white spot, extending from costa towards hind margin, and directly over the summit of the lower white area. Just within hind margin, one-third distance from apex to lower angle, is a smaller white spot, and there is another below it, one-third distance from lower angle to apex. The latter of these merges into the white area of the lower portion of the wing.

Upper side of lower wing is entirely white, excepting a small area of black at the very base, and a narrow border of black along hind margin. This border is black at the upper angle, and turns to grayish at the lower half, disappearing entirely just before it reaches anal angle. Outside of this, on the edge of the margin, is a white thread.

The white area of upper side of fore wing is duplicated on under side. The black of the upper side gives way to a great extent to tawny. The discoidal space is jet black at its upper portion, tawny at basal portion,

the black extending down along the median nervure towards base. In the centre of the black area is a white spot. Separating the black from the tawny is a thread of very lustrous greenish-blue, nearly silver. This tawny colour extends to costa, the costa being tawny up to apex. A greenish-blue lustrous line extends from base along costa for one-quarter inch. The large white spot of upper surface is repeated. The first white spot at hind margin of upper surface is repeated, but suffuses strongly upwards to the costa, forming an apical band of white. At inner edge of this band is a heavy tawny line, the costal and lower portion of it tipped with lustrous greenish-blue scales. The lower white spot is the same as on upper surface. The hind margin has a black thread at its edge, and within this a line of tawny, edged on its inner side by a thread of the lustrous scales.

The lower side of lower wings is the same as upper surface, except the black is replaced by tawny, and the marginal border is edged on its inner side by a thread of lustrous greenish-blue, with a suggestion of a black thread within it.

Type, one specimen ; taken October 1st, 1899.

Amarynthia muscolor, sp. nov.

Habitat: Bolivia, five days travel north from Cochabamba. Expanse, 1.25 inches.

Head, thorax and abdomen, nearly black, with approach to dark mouse colour on top. Antennæ, black, with slight white annulations at base of each joint. Legs, black.

General ground colour of upper surface, a dark mouse colour, with black markings. Costa of fore wings of ground colour. Hind margin, without border, except a slight linear black line and a fringe of hairs. One-eighth inch within margin is a semi-distinct black line, extending from tip down to inner margin, and another the same distance within this. The discoidal space contains four distinct black transverse lines, the outer two joining at top and bottom, forming an egg-shaped figure. From the lower junction of these, a black line extends downwards at right angles to the costa to the submedian nervule. The inner two of these discoidal lines do not join, but each extends downwards to submedian nervule. There is a suggestion of still another line, nearer the base, extending also to the submedian nervule.

Upper surface of hind wings nearly duplicates that of fore wings. The hind margin with its two inner lines and hairy fringe is the same.

The inner line forms a continuation of the line of fore wings which extends downwards from the egg-shaped figure, noted above. The outer line of the inner two lines mentioned as crossing the discoidal space of fore wings extends across the wing from costa to anal angle, where it joins the two broader lines. Within this, in discoidal space, are three lines, and a suggestion of a fourth near the joint. Inner margin, of ground colour, fringed with hairs.

The under surface is brilliant, the outer half of both wings being sky blue with a mother-of-pearl lustre. The costa of fore wing is mouse colour, with a linear dash of sky blue extending upwards from base. Hind margin is same as on upper surface, except that the slight hairy fringe shows whitish. The inner half of wing is blue-black. The dividing line between the inner and outer half is broken at the first median nervule, forming a jut. The discoidal space contains four sky blue spots, the second and fourth from the base being very prominent. Below the second one, above the submedian nervure, is another spot of the same colour. The space above inner margin is mouse colour, somewhat suffusing the blue-black of inner half of wing.

Under surface of hind wings much the same. The border of hind margin is same as on fore wings, but the first border line of the upper surface is duplicated. The line separating the blue-black and sky blue is continuous, extending from midway between apex and base to anal angle. The discoidal space contains but two sky blue marks, which are duplicated in a less degree in the space next below. The inner one is also duplicated similarly in the space above the discoidal space. The sky blue of outer half of wing extends upwards somewhat, along inner margin, and also suffuses the lower portion of the blue-black ground.

Described from three specimens in my collection from Cochabamba district, 1899.

Eurybia liari, sp. nov.

Habitat: Bolivia, north of Cochabamba. Expanse, 2.15 inches.

Head and eyes, dark fulvous brown, with a "collar" of reddish-brown yellow. Antennæ, nearly black, with yellowish points. Thorax and abdomen, dark mouse colour, somewhat lighter underneath. Legs, the same.

General ground colour of wings, dark mouse colour, with a border (interspacing) of reddish-brown yellow, covering nearly one-third of both fore and hind wings.

Costa of fore wings, dark mouse colour. Inner two-thirds of wing the same, excepting a prominent black spot in discoidal space, surrounded by a reddish-brown yellow ring, and outside of this a semicircle of same colour. Hind margin has a linear border of ground colour. The interspaces of hind margin contain a dash of reddish-brown yellow extending as far as discoidal space in upper three interspaces and paralleling downwards. These dashes form practically a broad band covering outer third of wing, the nervures of ground colour only showing between them. The outer end of these dashes contains a black arrow-head, small at top interspace, and increasing in size in lower interspaces. The inner end of these dashes contains a black dash, increasing in size in lower interspaces.

The hind wings duplicate these markings, with the following exceptions: The discoidal spot is much less prominent. The semicircle outside of it is missing. The linear border is also missing, the reddish-brown yellow extending clearly to margin.

The under side of both wings is the same as upper side, excepting that the ground colour is much lighter, and the yellowish portions suffused somewhat with ground colour. The discoidal spots are more prominent owing to the lighter shade of the background, rather than to any change of their own.

The general appearance is close to *Eurybia Jemina*, Hew.

Described from two specimens in my collection, secured by my collector, Mr. William J. Gerhard, at a point five days north from Cochabamba, Bolivia. In all the collections examined, including the largest collections in this country and in England, only one of this species was found, that being in Mr. Hewitson's collection, unnamed.

THE COLORADO POTATO BEETLE IN ENGLAND.

Although the announcement that the Colorado beetle had been discovered at Tilbury Docks (near London) must have given rise to some apprehension on the part of agriculturists in general, and potato-growers in particular, we are able to state, as the result of inquiries, that there now exists no cause for alarm, the prompt action of the Board of Agriculture having succeeded in exterminating, so far as is possible to judge, the dangerous insect. Little, if any, damage was done by this visitation, which seems to be the first for fifteen or twenty years. The land around Tilbury Docks is not agricultural, and if potatoes are

cultivated it is by the labourers who obtain allotments for the purpose of growing vegetables for their own consumption.

The story of the discovery of the Colorado beetle at Tilbury is briefly this: Situated at the north-east corner of the docks belonging to the London and India Dock Company, are some allotment gardens, occupied by employés of the company for the consideration of a "peppercorn" rent. Whilst gardening in one of these plots, a man came across what to him was a strange insect, unlike anything he had seen before. In his perplexity he made inquiries, the result being that the Board of Agriculture were communicated with. That body submitted the insect to their experts at the Natural History Museum, at South Kensington, who pronounced it to be the Colorado beetle. Representatives of the Board of Agriculture were despatched to Tilbury immediately, and they made a most careful examination, not only of the land affected, but of the surrounding area, in which work they were accorded every assistance by the officials of the dock company. The plots upon which the beetle had been found were first dealt with, all the vegetation being cut down, made into small heaps, and burnt with the help of hundreds of gallons of oil. The ground was afterwards ploughed vigorously, and minute care was taken in destroying the insects. The land adjoining received similar treatment. So complete and thorough were the means adopted that when the inspectors of the Board of Agriculture left the scene they expressed in no equivocal terms the conviction that the dangerous pest had been wholly annihilated.

How the beetle came into this country is, of course, a matter for conjecture. It may, however, be reasonably assumed that it was imported in one or more of the American boats which call at Tilbury, but, although the transatlantic steamers were searched, no trace of the pest could be found.

All persons occupying land in the vicinity of Tilbury have been warned to look out for the beetle, and if there should be another outbreak to give immediate notice to the Board of Agriculture through the police. The penalty for disobedience involves a penalty not exceeding £10, and it should also be remembered that keeping or selling any living specimens constitutes an offence under the Act, and is punishable by a fine not exceeding a similar amount. The insect is known to most people as being somewhat like a large "lady-bird," having longitudinal black lines down the wing-cases, the underneath being of a yellowish tint.—*Daily Telegraph*, Sept. 5.

SOME NECESSARY CHANGES AND CORRECTIONS IN NAMES OF ORTHOPTERA.

BY JAMES A. G. REHN, PHILADELPHIA, PA.

MANTIDÆ.

MIOMANTIS, Saussure. Bull. Ent. Suisse, III., p. 64, 1870.

Preoccupied by *Miomantis*, Blanchard. D'Orbigny, Voy. Amer. Merid., VI., Ins., p. 209, 1842 (Coleoptera). To fill the deficiency, I propose the name *Calidomantis*.

HARPAX, Serville. Ann. Sci. Nat., XXII., p. 45, 49, 1831.

Preoccupied by *Harpax*, Parkinson. Organic Rem., 1811 (Mollusca). I have not been able to examine the first edition of Parkinson, but in the second the name *Harpax* occurs on page 221 of volume III. To replace Serville's genus, I propose the name *Australomantis*.

PHASMIDÆ.

PHANTASIS, Saussure. Miss. Scient. Mex. Orth., p. 188, 1872.

Preoccupied by *Phantasis*, Thoms. Essai Classif. Cerambyc., p. 25, 1860 (Coleoptera). The name *Hesperophasma* is proposed to fill the deficiency.

ACRIDIDÆ.

AKENTETUS, McNeill. Proc. Davenport Acad., VI., p. 225, 1897.

This generic name has been emended to *Acentetus* (Scudder, Proc. Amer. Acad. Arts Sci., XXXV., p. 45, 1899), in which case it is preoccupied by *Acentetus*, Cabanis (Mus. Hein., IV., pt. 1, p. 102, 1862), in Ornithology. This instance should help to deter the lovers of emendation and purity, the inviolability of the name being the easiest and most satisfactory method in this as well as all cases where a *typographical* error is not evident.

ALPHA, Brunner. Ann. Mus. Cio. Stor. Nat., Genova, XXXIII., p. 121, 1893.

Preoccupied by *Alpha*, Saussure. Smith. Misc. Coll., XIV., p. 121, 1875 (Hymenoptera). In allusion to the habitat of some of the species, I propose the name *Cordillacris*.

The genus *Beta* of Brunner (p. 121) is also antedated in the same way (Misc. Coll., XIV., p. 88), but as his name has no type or included species designated, it cannot be regarded as thoroughly established.

ICHTHYDION, Saussure. Revue et Mag. de Zool., p. 390, 1859.

Preoccupied by *Ichthydion*, Dejean. Catal. Coleopt., II., 1833 (Coleoptera). In the third edition of Dejean, the name is found on page 223. To replace the preoccupied name, I propose the term *Ichthyotettix*.

EREMOBIA, Serville. Orthopteres, p. 704, 1839.

Preoccupied by *Eremobia*, Stephens. Catal. Brit. Ins., Lepidoptera, p. 104, 1829 (Lepidoptera). The next available name is *Tmethis*, Fieber, Lotos, III., p. 128, 1853.

XIPHOCERA auct (*Xiphicera*).

The use of this name by Latreille (Fam. Nat. Regn. Anim., p. 415) is merely in the French form *Xyphicère*, and as far as I can ascertain, he never used it Latinized in any of his later works. Lamarck is the first author I have found who Latinized the name, *Xiphicera* dating from him (Anim. Saus. Vert., II. ed., IV., p. 444, 1835). The form generally quoted *Xiphocera* (Burmeister, Handb. d. Entom., II., p. 612, 1838) is preoccupied by *Xiphocera*, Macquart. Dipteres, I., p. 279, 1834 (Diptera).

TROPINOTUS, Serville. Orthoptères, p. 617, 1839.

This name is generally quoted as *Tropidonotus* (Stol, Syst. Acrid., p. 14, 1877), but the emended form is preoccupied by *Tropidonotus*, Kuhl. Wagler's Nat. Syst. Amph., p. 179, 1830 (Reptiles).

TETTIGONIDÆ.

SCHÆNOBATES, Saussure. Revue et Mag. de Zool., p. 209, 1859.

Preoccupied by *Schænobates*, Blackwall. Ann. and Mag., Nat. Hist., VI., p. 343, 1850 (Arachnida). In place of the preoccupied name, I propose *Anabropsis*.

PSEUDANCISTRUS, Bolivar. Artr. Viaje Pac., Neur. y Ort., p. 82, 1884.

Preoccupied by *Pseudancistrus*, Bleeker. Ned. Tijds. Dierk., I., p. 78, 1863 (Fishes). I suggest *Polyancistroides* to replace the preoccupied name.

AMAURA, Brunner. Monogr. der Phaneropt., p. 247, 1878.

Preoccupied by *Amaura*, Moller. Ind. Moll. Grœul., p. 7, 1842 (Mollusca). The name *Ligocatinus* is proposed to fill the vacancy.

GRYLLIDÆ.

APHONUS, Saussure. Miss. Scient. Mex., Orth., p. 466, 509, 1874.

Preoccupied by *Aphonus*, Leconte. Proc. Acad. Nat. Sci., Phila., VIII., p. 21, 1857 (Coleoptera). To replace the preoccupied name, I propose *Aphonogryllus*.

DYSCOPHUS, Saussure. Miss. Scient. Mex., p. 438, 1874.

Preoccupied by *Dyscophus*, Grandidier, Ann. Sci. Nat., V. ser., XV., art. 20, p. 10, 1872 (Reptiles). In place of Saussure's name, I propose *Dyscophogryllus*.

THE EASTERN SPECIES OF PSYCHODA.

BY NATHAN BANKS, EAST END, VA.

In the CANADIAN ENTOMOLOGIST for December, 1894 (Vol. XXVI., page 329), I presented the species of *Psychoda* then known to me from Long Island, N. Y. In the following year, in the November number (Vol. XXVII., page 324), I added some notes and described one more species. Since then nothing has been published on our Eastern species. Prof. Kincaid, however, has been active in studying the Western species.

During the past few years I have collected them at Washington and vicinity, and obtained three new species as well as many of those previously described. I now give a table of all the Eastern species, twelve in number, with descriptions of the three new forms:

TABLE OF SPECIES.

- | | |
|--|---------------------|
| 1. Black-winged species..... | 2. |
| Gray-winged species..... | 8. |
| 2. Wings with iridescent scales, hind tarsi only partly white..... | <i>nitida</i> . |
| Wings without iridescent scales..... | 3. |
| 3. Hind tarsi wholly pale yellowish or whitish..... | 4. |
| Hind tarsi black or only partly pale..... | 5. |
| 4. Two black patches on the wings before the middle..... | <i>marginalis</i> . |
| No black patches..... | <i>albitarsis</i> . |
| 5. Hind tarsi wholly black, wings and fringe all black..... | 6. |
| Hind tarsi with some white marks, wings and fringe marked with pale..... | 7. |
| 6. Thorax white..... | <i>bicolor</i> . |
| Thorax black..... | <i>nigra</i> . |
| 7. Fringe on posterior margin blackish; abdomen with white hair; wings banded with pale, legs pale..... | <i>Slossonae</i> . |
| Fringe on posterior margin more whitish; apical margin with distinct black dots, wings not plainly banded, though with scattered white hair; legs black..... | <i>superba</i> . |
| 8. Wings uniform gray..... | 9. |
| Wings marked with black..... | 10. |
| 9. Larger; at least two millimeters long; fringe on hind margin fully as long as usual..... | <i>cinerea</i> . |

- Smaller; less than two millimeters long; fringe on hind margin rather short. *minuta*.
10. Hind tarsi with black at base and tip; wings banded, with distinct dots at ends of veins, but not two spots on margins beyond middle. *signata*.
- Hind tarsi unmarked (yellowish); dots at ends of veins; wings scarcely banded, no basal black band, nor two spots on margins beyond middle. *alternata*.
- Hind tarsi uniform dark brown; wings with a basal black band, beyond the middle a black spot on each margin, and one or two apical dots. *opposita*.

Psychoda cinerea, Banks.—This species is known by its uniform pale appearance and average size. It is common at Washington, D. C., and Falls Church, Va., in June, and occurs at Ithaca, N. Y.

Psychoda minuta, Banks.—This is our smallest species; I have seen a specimen from Mesilla, N. Mex. (Cockerell).

Psychoda alternata, Say.—This species is common at Falls Church, Va., near houses, in June. It also occurs at Ithaca, N. Y. Eaton has decided that one of the common European species (*P. sexpunctata*, Halid.) is identical with *P. alternata*. The latter name has the priority.

Psychoda signata, n. sp.—Head and thorax clothed with white hair, some tufts of gray at bases of wings; antennæ white, about as long as width of wing; legs white, last few tarsal joints black, and a black ring on base of the first tarsal joint of hind legs; abdomen clothed with white hair. Wings marmorate with pale gray and blackish, rather thinly clothed with hair; a blackish patch near base, another rather before the middle from costa to centre of wing, one on posterior part about behind this one, a long one along the apical costal third of wing, often interrupted by three pale spots, and a few small patches on the apical third of hind margin; all these spots are blackish, irregular, and of indistinct outline. The fringe on costal margin is largely gray, but with two white patches, and the apex white; on middle of hind margin is a long white portion, the rest of the fringe is blackish; the fringe on the hind margin is about one-third the width of the wing. Length of wing, 2 mm.

A few specimens taken near Washington, D. C., in May.

Psychoda opposita, n. sp.—Head and thorax clothed with pale gray hair; antennæ thick, gray, longer than width of wing; abdomen clothed with rather short gray hair; legs brown, none of the tarsi marked with

white. Wings thickly clothed with pale gray hair; near base is a band of black hair, heaviest behind; slightly beyond the middle of the wing there is a black spot on the costal margin and another opposite on the posterior edge, the latter rather the larger; the extreme margin around the tip appears more or less black. The fringe is mostly pale gray, or almost white, on the hind margin; on the base of costal margin it is dark gray; that on posterior margin is almost one-half the width of the wing. Wings rather narrow and acute at tip. Length of wing, 1.7 mm.

Taken at Washington, D. C., on the bark of trees, in the early part of August. Easily known by the two black spots on each wing.

Psychoda albitarsis, Banks.—I have seen specimens only from the type locality, Ithaca, N. Y.

Psychoda marginalis, Banks.—I have only the types of this species, from Sea Cliff, N. Y. It is very distinct by the two patches of black hair on wings.

Psychoda Slossonæ, Williston.—My specimens are all from New York.

Psychoda superba, Banks.—This handsome species is very common at Washington, D. C., from June to August, on the bark of large trees.

Psychoda bicolor, Banks.—I have seen only the types from Sea Cliff, N. Y.

Psychoda nigra, Banks.—I have taken several specimens of this species at Falls Church, Va., close to a stream, in June. The fringe on the hind margin of wings is very long.

Psychoda nitida, n. sp.—Thorax in front densely clothed with long gray hair, behind at the bases of wings it is darker, often black. Abdomen black, with jet black hair. Legs black, with black hair; on the basal joints of all tarsi are some white scale-like hairs. Wings clothed with black, and some iridescent scales showing a bluish, greenish or coppery hue, according to the light and position. Fringe black, white at tip of wing. Tips of veins usually show heavier patches of black hair or scales. Antennæ slender, moniliform, slightly longer than the width of wing. Wings moderately broad, scarcely acute at tip, the fringe on posterior margin being about one-fourth the width of the wing.

Length of wing, 2.6 mm.

This species is found at Washington, D. C., on the bark of large trees, in July. The iridescence of the scales on the wings at once separates it from all our other forms.

CONCERNING PROTESTS AND OTHER THINGS. •

BY JOHN B. SMITH, SC. D., RUTGERS COLLEGE, NEW BRUNSWICK, N. J.

There never yet was anything new or revolutionary advanced or suggested that was not met with a "protest" from some quarter. When machinery was introduced the hand-workers protested; when railroads supplanted stage coaches the coachmen protested; and so on. So we never had a new list in any order of insects, where changes in nomenclature were made, which was not denounced by someone who found himself or herself compelled thereby to take new views or learn new names.

Of course, protests have their uses, and are always interesting; so, that by Mr. Heath, in the September number of the CANADIAN ENTOMOLOGIST, was carefully read by me. Of course, it should really be answered by Dr. George D. Hulst; but he is, unfortunately, dead, and as he was a very good friend of mine, I will do the best I can in his behalf as well as my own, for I must plead guilty to being an American, and am uneasily suspicious that, since I happen to know about *Tephroclystis*, I must be included among the pseudo-savants.

Let me say first of all that Mr. Heath has been for some time a very good correspondent of mine, that I have found him always open-handed and open-minded, ready to do all in his power to further entomological science, anxious to aid, and willing to be aided; therefore, whatever I may say here is not meant as a reflection upon him—only an appeal to his natural love of justice, and a plea that he do not scold too hastily.

A protest always carries weight in proportion to the authority or knowledge of him that makes it, or the force of fact or argument with which it is backed up. Now, what does Mr. Heath really protest against? Specifically, only the use of *Tephroclystis* is mentioned, but inferentially other "new" and unfamiliar names are included in the ban. *Tephroclystis* is not so well known perhaps as *Eupithecia*, though it may rival "pugs" in familiarity; but would it not have been fair for Mr. Heath to show, first, that it is really a new name, and second, that there was no sound reason for the change other than that it did not mean "pugs." Before making his protest and scolding "American pseudo-savants" he should have made sure of his ground, and become genuinely "savant" himself. Had he done so he would have found that *Tephroclystis* is a Hubnerian term far antedating *Eupithecia*, Curtis, and that, following the law of priority, Hubner's name simply had to be used. If

it be objected that nomenclature ought not to be disturbed, and things ought not to be upset, it might be in order to suggest that Lord Walsingham and Mr. C. Hartley Durrant, both good Englishmen, have been the greatest disturbing factors of the decade so far as reinstating Hubner's names is concerned. A great part of Mr. Heath's scolding in the second paragraph, therefore, applies to them more perfectly than to any American entomologist. Finally, it may be noted that in Staudinger and Rebel's catalogue, just issued, *Eupithecia* is replaced by *Tephroclystis*, Hbn., and *Chloroclystis*, Hbn. Dr. Hulst was, therefore, neither arbitrary nor singular in using the term.

I am greatly afraid that, unless he wishes to remain solitary, Mr. Heath must give up *Eupithecia*, though there is no canon of nomenclature that opposes his hold on "pugs."

American entomologists and American naturalists generally are accused of being narrow, and confining their ideas "to their own little collections," etc., and this charge is just about as well based as the other. The truth is there are no broader students, literally and otherwise, to be found anywhere than in America; which is not saying that we do not have the other kind as well. But specialists are needed as yet where so much material remains undescribed, and the would-be monographer of a world-wide fauna finds himself very frequently compelled to limit his ambition by the wealth of new local material coming in to him.

There are many of the newer entomological recruits who do not realize the difficulties with which the earlier students had to contend. Before 1860, almost all American Lepidoptera were described in foreign publications, from Linné to Guenée and Walker. So, of necessity, the American student became familiar with the general world classification to that date. For years afterward everything was compared with European species, and, so far as possible, American forms were identified with those of other countries. Students like Zeller, Speyer, Moeschler and Staudinger co-operated, and the charge that American work was done without regard to what has been done elsewhere is simply absurd.

Of course, as in all countries, the work of special students was more or less confined to the local fauna. The fact that in so many countries work was simultaneously done has resulted in duplicating descriptions of similar structural combinations under different generic names. It is the work of the student now, to collate and systematize, as Sir George F. Hampson is doing with the British Museum material at command. This

will, of necessity, cause some change and shifting of names. I am led to say further, that no students have travelled so much to make comparisons as have the Americans. Grote, Fernald, Hulst and others, as well as myself, have visited all the European collections — some of us more than once — and have spent dollars, pounds, francs and marks in painful number to gain that broad knowledge for which we are now dubbed "pseudo-savants."

Now, I doubt whether I would have imposed all this upon the readers of the CANADIAN ENTOMOLOGIST except as a sort of introduction to another point, which the following quotation from a correspondent's letter will make clear: "In sending specimens to be determined in the customary way (the namer to have the privilege of retaining any specimens he may desire), if I send a species *new to our fauna*, does custom require its return to the sender, or is the recipient to keep, name and describe it—i. e., *steal* it bodily?" The italics are as in the original.

Now, how many persons who have asked that same question, and who have found fault with the answer, ever really understand what they are asking when they send in a box of insects numbering anywhere from 25 to 250 specimens for determination to one who is under no sort of obligation to do it?

First, they draw upon a store of knowledge that has been acquired by over twenty years of study; they demand the time necessary to make comparisons, to unpack, repack, often the replacement of a defective outer box or a new cover; very often the payment of return postage, almost always the payment of correspondence postage. Second, they often expect comments or information concerning the species, its rarity, value, larva or its life-history, and other matters too numerous to mention.

And in return for all this, what do they offer? In many cases nothing at all; but rather claim it as a right; in other cases, permission to retain such as they have in duplicate!

I have frequently spent a solid half day naming a box of specimens in which there was not a single example that was of use to me! I need hardly say that I could have found more profitable employment for my time. In Noctuids, the collection under my charge at New Brunswick is, perhaps excepting that of the U. S. National Museum, the most complete in the country. Of the Eastern and Central U. S. species, not a dozen are lacking; but that dozen I need badly. Once or twice each year, out of hundreds of species that pass through my hands, I find one

or two of the desiderata. It is the only pay I ask,— permission to retain such as are needed for the collection, and I do not consider it excessive. When I say that during the winter months I frequently get half a dozen sendings in one week, and often spend an entire day of ten hours in making determinations, the extent of the labour imposed on me may be estimated.

I wish it to be distinctly understood that I do not object to making determinations ; it is a real pleasure to me to look over a lot of material, especially if in good condition and from a new locality ; but I do feel sometimes that my work is not appreciated, and that an insect or two retained for the collection is rated exceedingly high when grumblingly yielded in return. It has occurred to me that where I have spent an hour or two in determining a species as new, and have given its genus, the collector to whom I returned it described it without even crediting me with the generic reference. Nowadays I give no such references.

Of course there are exceptions to all rules, and so many of my correspondents are liberality itself, giving me absolute disposal of the material sent for study, they will not apply what I have said to themselves, and will, I think, testify that I do not often abuse their confidence. I will repeat, however, that Mr. Heath comes in with the exceptions, and is a *persona grata* on my list. I cannot promise to be influenced by his protest, but I can recommend him as a very amiable and satisfactory correspondent.

CATERPILLARS ATTENDED BY ANTS.

In his paper on "The Food-plants of the Butterflies of the Kanara District of the Bombay Presidency," Mr. L. de Nicéville, of Calcutta, states (page 190) that the choice of the food-plant by the butterfly, in the case of many of the *Lycanida*, is largely dependent upon the presence of the particular species of ant with which it lives in harmony in its larval condition. "If the right plant has no ants, or the ants on that plant are not the right species, the butterfly will lay no eggs there. Some larvæ will certainly not live without the ants, and many larvæ are extremely uncomfortable when brought away from their hosts or masters. In many cases it is just as important for breeding purposes to know the right species of ants as to know the right food-plant. In Kanara this is particularly noticeable in the cases of *Castalius ananda*, *Zesius chrysomallus*, *Aphnaeus lohita* and *Catapœcilima elegans*. *C. ananda*

is 'protected' by ants of the genus *Cremastogaster*. On one occasion Mr. Bell was collecting larvæ at Katgal, and the ants were principally on *Zizyphus rugosa* (Nat. Order *Rhamnæ*), but were also swarming all over six or seven different species of trees all around, and on all of these trees there were larvæ of *C. ananda* covered with ants and eating the leaves of the trees in every case. Since then he has noticed the larvæ of this butterfly eating the leaves of many different plants and always in company with the same species of ants. With regard to the other butterflies mentioned above, the females first look for the right species of ant, while the species of food-plant seems to be quite a secondary consideration, at any rate to a considerable extent. The larvæ of *Zesius* may be found on very nearly any plant that harbours the large red ant, *Ecophylla smaragdina*, so much so that Mr. Bell has often had a suspicion that the butterfly larvæ will occasionally eat the ant larvæ, though he has not actually seen them do so. The larvæ of the other two butterflies are only found on plants affected by ants of the genus *Cremastogaster*. The larvæ of all the four species are often found in the ants' nests, and their pupæ occasionally." Mr. de Nicéville then gives a list of twenty-seven species of *Lycenidæ*, twenty-four of which are attended more or less frequently by ants.

As long ago as 1878, Mr. W. H. Edwards gave in this magazine (CAN. ENT., Vol. X., pp. 131-136) a most interesting detailed account of his observations on the larvæ of *Lycæna pseudargiolus* and the attentions bestowed upon them by four different species of ants. The object of the ants was to obtain the sweet fluid extruded by the larvæ, and in return they warded off enemies threatening the caterpillars in their charge.

Mr. S. H. Scudder also gives an interesting "Excursus" on this subject in his great work, "The Butterflies of the Eastern United States and Canada," page 962, Excursus XXXV.

PUPÆ OF LYCENIDÆ.

In the paper already referred to (page 247), Mr. de Nicéville gives a list of eight genera of *Lycenidæ* which have the pupa suspended by the cremaster alone with no median girth; on this account he considers that they seem to form a very natural group, as it is an extremely rare character in this family of butterflies. This fact rather upsets the familiar division of the Rhopalocera into Succincti, Suspensi and Involuti, in accordance with the mode of attachment of the pupæ.

BEES FROM SOUTHERN CALIFORNIA, VISITING FLOWERS
OF ERIOGONUM AND RHUS.

BY T. D. A. COCKERELL, EAST LAS VEGAS, N. M.

Southern California has its dry season in the summer, and comparatively few flowers are to be seen. Among those that remain, and are attractive to insects, the bushy species of *Eriogonum* are especially noteworthy, and I was fortunate in obtaining from them several bees.

Eriogonum fasciculatum was determined for me by Mrs. K. Brandegee. The Mt. Lowe species, which look very distinct from *fasciculatum*, is kindly identified by Miss Susan G. Stokes as *E. fasciculatum polifolium*, "one of the intermediate forms." This is the *E. polifolium* of Benthams.

Prosopis polifolii, n. sp.—♂. Agrees with the description of *P. Nevadensis* (Psyche Suppt., June, 1896, p. 32) except in the following particulars: Clypeus and lateral marks very pale primrose yellow; the lateral marks rather narrow, triangular, not or hardly notched by the antennal sockets, terminating above at a very acute angle with the orbital margin, though the apical point is rounded, the inferior inner side of the triangle at least not longer than the superior, sometimes visibly shorter; flagellum ferruginous beneath; wings clear, strongly iridescent. There is no vestige of a supraclypeal mark; clypeus much longer than broad, punctured and minutely roughened.

Hab.—Alpine Tavern, Mt. Lowe, Calif., about 5,000 ft., Aug. 12, 1901, on flowers of *Eriogonum polifolium*; La Jolla, Calif., about 150 ft., August, 1901, on flowers of *Eriogonum fasciculatum*. The first-mentioned locality is to be regarded as typical. The species, having no supraclypeal mark, can only be confused with *P. Nevadensis*.

Ceratina Arizonensis, Ckll., 1898—♀. Similar to the ♂, but the face is black, with a broad longitudinal white stripe on the clypeus.

Hab.—Alpine Tavern, Mt. Lowe, Calif., about 5,000 ft., Aug. 12, on flowers of *Eriogonum polifolium*. New to California.

Perdita Claypolei, n. sp.—♀. Length, 5 mm.; head and thorax dark brassy green, with moderately abundant white hair; abdomen piceous, with broad straight transverse chrome-yellow bands at bases of

segments two to four, none of them reaching the lateral margins of the segments; ventral surface dark. Head rather large, transversely oblong, broader than thorax; *face wholly dark*; front microscopically tessellate, with sparse distinct punctures; occiput with abundant white hair; antennæ short, dark, flagellum ferruginous beneath towards tip; anterior margin of prothorax above, and tubercles, cream-colour; mesothorax and scutellum shining but microscopically lineolate, with very sparse punctures; base of metathorax minutely roughened; tegulæ tinged with brown; wings short, reaching about to middle of fourth abdominal segment, the apical veinless field large; nervures dark brown; stigma centrally pale; marginal cell obliquely truncate, its post-stigmatal portion largest; second submarginal cell large, narrowed about one-half to marginal; third discoidal cell distinct; legs piceous; anterior knees and anterior tibiæ in front, cream-colour; apex of abdomen ferruginous, acutely pointed.

Hab.—Alpine Tavern, Mt. Lowe, Calif., about 5,000 ft., Aug. 12, three on flowers of *Eriogonum polifolium*. The hind femora carry great masses of yellow pollen. In my tables this runs to *P. sphaeralcea*, but *P. Claypolei* is a smaller insect, with darker nervures and a much more shiny mesothorax.

A few hundred yards from the spot where this species was taken, one comes to a point which commands a splendid view of the lowlands, with the City of Pasadena, the scene of the last labours of Prof. E. W. Claypole, in the distance. The bee is accordingly named after the inspiring teacher and able naturalist who has so recently been taken from us.

Colletes Americana, Cresson, 1868. — Four males at flowers of *Eriogonum fasciculatum*, La Jolla, Calif., Aug., 1901.

I take this opportunity to describe another new Californian *Perdita*, not found on *Eriogonum*: —

Perdita rhois, n. sp. — ♀. Length, 5 mm.; head and thorax dark bluish-green, base of metathorax decidedly blue; pubescence short and scanty; abdomen piceous, with broad straight transverse yellow bands on bases of segments 2 to 5 (rarely absent on 5), all but the first produced to the lateral margins of the segments, though narrowed a short distance before the margin; ventral surface of abdomen yellow. Head ordinary, nearly circular seen from in front; clypeus not in the least concealed by hair; clypeus (except two minute dots) and lateral

marks chrome-yellow ; lateral marks small, nearly equilateral triangles, not reaching up to antennæ ; no ~~supraclypeal~~ or dog-ear marks ; mandibles yellow at base, ferruginous in middle, dark at tips ; labrum dark, with a central depression ; labial palpi with the first joint a trifle longer than the other three united ; antennæ dark brown above, chrome-yellow beneath, including scape ; front microscopically tessellate and with sparse minute punctures ; mesothorax shining, but microscopically tessellate and sparsely punctured ; tubercles yellow, but no other part of prothorax ; tegulæ transparent, with a yellow spot ; wings milky-hyaline, iridescent ; nervures white ; *stigma very large*, colourless, with a light brown margin ; marginal cell rather obliquely truncate, the post-stigmatal portion the shortest ; third discoidal cell distinct ; legs dark, anterior knees, anterior tibiæ except a stripe behind, and middle tibiæ beneath, yellow ; anterior tarsi yellowish.

Mut. *reducta*.—♀. Clypeus with two very broad black median bars, between which is left only a small yellow streak or triangle ; lateral marks wanting or represented by two or three small spots ; tubercles wholly dark ; scape without the yellow stripe ; abdominal bands narrow, not reaching lateral margins, sometimes only the first two bands well developed ; venter of abdomen dark.

Hab.—San Diego, Calif., Aug. 4, 1901, at flowers of *Rhus laurina*, Nuttall, in the immediate vicinity of the Brandegee Herbarium. The plant was kindly identified by Mrs. K. Brandegee. There were taken four of the type, and three of mut. *reducta*, all from the same shrub. The dichroism of the species is quite remarkable.

In my tables, *P. rhois* runs to *P. bigeloviae*, and is especially to be compared with *P. Crawfordi*, from which it differs by its large stigma and other characters.

While on the subject of *Perdita* the following may be placed on record :—

Perdita callicerata, Ckll. ; Mesilla Park, N. M., June 9, 1898, one ♂ at flowers of *Atamosco longifolia* (*Zephyranthes longifolia*, Hemsley).

MR. E. S. G. TITUS wishes mention to be made that his recent articles on Bees in this magazine, Vol. XXXII., page 303, and Vol. XXXIII., pages 133 and 257, are to a large extent portions of a thesis for the Degree of M. Sc. placed on file with the Secretary of the State Agricultural College of Colorado, May 1st, 1901.

SOME NEW DIPTERA.

BY CHARLES ROBERTSON, CARLINVILLE, ILLINOIS.

Zodion palpalis, n. sp.

♀.—Black, gray pollinose; face yellow, cheeks yellow, one-half the eye height; front reddish yellow, a narrow black line on each side above; antennæ reddish, second joint shorter than third; palpi black, quite long, clavate; mesonotum without stripes; scutellum with about twelve slender bristles; legs black, knees testaceous; wings subhyaline; first four segments of abdomen with large, subtriangular opaque black spots, last segment black, shining. Length, 5 mm.

♂.—Cheeks more than one-half the eye height; second and third segments of abdomen yellow, fourth with a subtriangular patch destitute of pollen. Length, 5 mm.

Carlinville, Illinois; one ♀, nine ♂ specimens. All except one specimen have the first posterior cell closed and petiolate.

This species is quite distinct from *Z. fulvifrons* and *Z. nanellum*.

Sphegina campanulata, n. sp.

♂.—Front black, grayish pollinose, with a median, narrow shining stripe; occiput black, lightly dusted; thorax and abdomen entirely reddish, the latter more shining, fourth segment in one specimen a little infuscated with blackish; face, cheeks, antennæ, proboscis and halteres more yellow; front and middle legs whitish, last two joints of their tarsi blackish; hind legs reddish, base of femora, tibiæ, except tips, and joints two and three of their tarsi whitish, last two joints of tarsi blackish; wings subhyaline, anterior outer angle of first posterior cell rectangular; second joint of abdomen longer than remaining joints together, fourth segment shorter and wider than third, the two regularly widening from base of three to apex of four, hypopygium very large. Length, 6-7 mm.

Carlinville, Illinois; two specimens.

Mallota Illinoensis, n. sp.

♀.—Eyes bare; face deeply concave below antennæ, tubercle as usual, the cheeks and median stripe shining black; front broader than in *M. posticata* and *cimbiciformis*, yellow pollinose, except a patch above antennæ, yellow pilose, on the vertex the pile long and reddish, antennæ blackish, second joint and arista reddish; mesonotum reddish posteriorly, with obscure pollinose streaks anteriorly, scutellum yellow and with the mesonotum clothed with long reddish pile; legs reddish, the femora more

or less blackish, the knees yellow, pile yellow ; wings with a brown cloud ; abdomen brown, shining, with thin fuscous pile, the pile on the sides, middle and apical margins longer, yellowish, less erect. Length, 14 mm.

♂.—Eyes separated, pile and pollen of face more whitish, anterior and middle femora darker, abdomen inclining to ferruginous, hind femur beneath presenting a dentiform angle bearing a tuft of black pile, sides of second segment presenting a depression which shows a purplish reflection. Length, 12–13 mm.

Carlinville, Illinois ; one ♀, two ♂ specimens.

Temnostoma trifasciata, n. sp.

This species closely resembles *T. bombylans*, but the wings are brown before, that colour not extending behind the fourth longitudinal vein ; the abdomen of female has only three fasciæ.

Carlinville, Illinois ; three ♂, two ♀ specimens.

Phorantha purpurascens, Twins.

Hyalomyia purpurascens, Townshend. Proc. Ent. Soc., Wash. 2 : 137, 1891. This species was described from four males and four females from my collection. It is more common in my neighbourhood than all of the other species of *Phorantha* and *Alophora* together. I know the species very well. I still have eighteen specimens from the set from which the types were described. Altogether I have forty males of this species and they all have the calypteres brown. On the other hand, twenty-one females have the calypteres whitish.

From the material afforded in my neighbourhood, I think that Coquillett's *P. occidentis* contains the females of at least three distinct species. Assuming that Walker's type was a female and that it was the commonest species, *P. purpurascens* may be a synonym. I do not believe that, without comparing the type, it can be shown that Walker's species was the same as *P. purpurascens*, or even that it was a *Phorantha*.

Hyalomyia Robertsonii, Twins., was also founded on specimens from my collection. I do not know what it is, but the specimens were larger than those of *P. purpurascens*, and all of the specimens I have that were referred by me to this species belong to *Alophora*. I think they are females of *A. æneovenstris*.

Phorantha pruinosa, n. sp.

♂.—Closely resembles the male of *P. purpurascens*, but the abdomen

is black, without any metallic reflection, the first segment shining, the second, third and fourth densely whitish pollinose. Length, 3 mm.

Carlinville, Illinois; three male specimens.

Phorantha humeralis, n. sp.

♂.—Closely resembles the male of *P. purpurascens*, but is larger, the wings more whitish, the base and costal margin as far as first vein more or less brown. Length, 4–5 mm.

♀.—Differs from females of *P. purpurascens* only in its larger size. Length, 4–5 mm.

Carlinville, Illinois; ten ♂, three ♀ specimens.

Epigrimyia Illinoensis, n. sp.

♂.—Closely resembles *E. polita*, front shorter and narrower, more narrow than face; the latter longer, wider, cinereous pollinose; cheeks wider; antennæ and proboscis longer; front tibiæ reddish; claws and pulvilli longer. Length, 5 mm.

Carlinville, Illinois; one ♂ specimen.

Winthemia Illinoensis, n. sp.

This species closely resembles *W. quadripustulata*. It differs in its smaller size, the bristles on the abdomen, especially in the male, more sparse, more erect, longer; the second segment in male with a marginal pair of macrochætæ; hind tibiæ, outwardly, in both sexes, less regularly ciliate and presenting a long bristle near the middle. Length, 6–9 mm.

Carlinville, Illinois; five ♂, three ♀ specimens. The sexes were taken in copula.

The name may not stand: the presence of this species seems to throw some doubt on Coquillett's synonymy of *W. quadripustulata*.

NEW BEES OF THE SUBFAMILY ANTHOPHORINÆ FROM SOUTHERN CALIFORNIA.

BY T. D. A. COCKERELL, E. LAS VEGAS, N. M.

Diadasia rinconis, subsp. *opuntia*, nov.—♀. About 15 millim. long, varying to 13 millim.; tegulæ light reddish-brown, varying to darker; wing-nervures piceous, second submarginal cell variable, but always small and usually very narrow, and narrowed above; third submarginal cell long, very strongly elbowed at end; labrum with only a few scattered hairs, or sometimes more hairy; mesothorax strongly and quite densely punctured, much more so than in *rinconis*; scutellum closely punctured;

abdominal bands as in *rinconis*, with curved anterior margins ; hair at apex of abdomen yellowish-fuscons.

Hab.—San Pedro, California, July 27, 1901, at flowers of *Opuntia*, gathering pollen. 17 ♀. First found by my wife. This will probably be regarded as a distinct species, but it is certainly very near to *D. rinconis*, which visits flowers of *Opuntia* in New Mexico (Entom., Sept., 1900, p. 245). The chief difference between *rinconis* and *opuntia* is in the much more strongly and densely punctured thorax of the latter ; *opuntia* is also on the average a considerably bulkier insect. From the Californian *D. friesei*, *opuntia* differs in the larger size, closer punctuation of thorax, and the character of the abdominal bands.

(To be continued.)

BOOK NOTICE.

ILLUSTRATIONS OF UNFIGURED LEPIDOPTERA.—By A. G. Weeks, Jr., 360 Washington St., Boston, Mass.

We have received from the author the first thirty-one pages of this work, which he is publishing for private distribution at his own expense. This portion contains the description of seven species of butterflies, all but one of which have been already published elsewhere, but are now illustrated by most beautifully-executed coloured lithographs from drawings by Mr. J. Henry Blake. The species are all from tropical or sub-tropical regions and the types are in the author's collection. The exquisite plates compare very favourably with those in Mr. W. H. Edwards's "Butterflies of North America," which have set a high standard of artistic merit and truth to nature.

An interesting account is given of a collecting trip in Bolivia, made by Mr. Gerhard, of Philadelphia, who was sent by the author to that out-of-the-way and little-known region in order to secure as complete a collection as possible of the butterflies of the country. Though the region explored was in the high altitudes of the Andes, where vegetation was mainly confined to the mountain ravines and river gorges, the collector succeeded in obtaining, during an absence of a little over a year, thirteen thousand butterflies, over a thousand dragon-flies, a thousand beetles, twelve hundred moths, and a large number of other insects. Among these there will no doubt be found many species hitherto

unknown to science, and much valuable information will be afforded by a study of the collection regarding the distribution of species. Mr. Weeks gives in the work before us lists of the butterflies which he has thus far been able to identify. A number of interesting photographic reproductions give some idea of the country traversed by the collector. We look forward to the issue of further instalments of this work, which will, when completed, form a valuable contribution to Lepidopterological Science.

C. J. S. B.

CORRESPONDENCE.

A SURPRISE.

SIR,—That a *Polyphemus* cocoon would produce its imago the same season it was made, is what I little expected to see ; and yet it has taken place ; and that in a brief period of time.

The janitor of the Y. M. C. A., London, Ont., was taking his holidays in the latter part of July, and on the 22nd was in the country on a fishing excursion, and found on the ground, under some trees, a *Telea Polyphemus* cocoon. On his return, he informed me of his find. Thinking it was rather early for one of this year's make, I remarked it must be an old one. He said no, that the creature was alive inside. When he presented it to me, I realized at once that it was a freshly-made one, as it was white and free from the slightest indication of weathering. The pupa was very lively, and kicked vigorously. I placed the cocoon on a cabinet close at hand and in full view, and it was much handled by visitors, who expressed surprise at such an inanimate-looking object being so much alive. On the 10th of August I tried to stir it into action for a visitor's benefit, but failed. I left the room about half-past five, and returned about half-past seven, when I noticed that the cocoon was where I had not placed it ; and, on examination, I saw the moth hanging to the projecting top of the cabinet. It is a female, perfectly developed, medium sized and light in colouring. The question naturally arises, is it double-brooded somewhere ?

J. ALSTON MOFFAT.

Mailed October 3rd, 1901.

ANNUAL MEETING AT LONDON ON NOV. 13th AND 14th.

The Canadian Entomologist

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REV. C. J. S. BETHUNE,

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EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

FOR EXCHANGE.—Butterflies of this neighbourhood, for those not in my collection. Have also a number of chrysalids of *Fenisea tarquinius* for exchange. Address: WILMON NEWELL, Wooster, Ohio.

ORTHOPTERA.—Wanted, specimens and literature for exchange. FRANK E. LUTZ, Zoological Bldg., University of Chicago, Chicago, Ill.

A NEARLY complete set of U. S. Agricultural Reports for exchange for some works on Entomology not in my library. Please make offer. GEORGE B. KING, Lawrence, Mass.

LEPIDOPTERA.—Would like to receive duplicate lists of collectors in every State. Rhopalocera especially desired. JOHN & HURD COMSTOCK, 1572 Ridge Ave., Evanston, Illinois.

DIURNALS, LEPIDOPTERA.—Will exchange French butterflies, in paper, for butterflies of U. S. A. and Canada. Please send lists. PROF. J. B. A. L. LEYMARIE, 25 Boyer Lane, near Rachel Street, Montreal, P. Q.

CICINDELIDÆ.—Wanted (Henshaw's List) Nos. 19b, 20, 23, 25d, 25g, 25h, 34b, 37, 48, 49, 50, 56. For *C. Willistoni* and *C. tenuicincta* write for terms.—W. KNAUS, McPherson, Kansas.

WANTED.—Insect Life, Vol. II., Nos. 1, 2, 9; Vol. IV., Nos. 7, 8, 9, 11; and Bulletins 1 to 4 of Cornell Exp. Station. Will give double exchange for same. WILMON NEWELL, Wooster, Ohio.

BRITISH GUIANA.—The advertiser is now collecting insects in Guiana. Would like to hear from anyone requiring good specimens from there. R. J. CREW, Georgetown P. O., Demerara, S. A.

DIURNAL LEPIDOPTERA wanted from the W. and N.-W. States for diurnals from Central and northern South America. LEVI W. MENGEL, Boys' High School, Reading, Pa.

ACULEATE HYMENOPTERA, especially Apoidea, wanted. Will give good exchange in Coleoptera or Hymenoptera. E. S. G. TITUS, Urbana, Ill.

LEPIDOPTERA: Sphingidæ, Arctiidæ and Saturniidæ of the world desired in exchange. Liberal exchange given. HENRY ENGEL, Box 369, Pittsburg, Pa., U. S. A.

WANTED.—Cicindelidæ, Carabidæ, and rare Scarabæidæ. Will give good exchange in Exotic and rare European Coleoptera (named), also Odonata and Hymenoptera from N. America. Send list to R. J. WEITH, Elkhart, Indiana.

DIPTERA wanted from Washington and British Columbia in exchange for North American Coleoptera. W. S. HUNTINGTON, 1910 N. Twenty-first St., Philadelphia.

PAPILIOS brevicauda, nitra, Oregonia, indra, female, nezahualcoyott wanted; also Cicindelidæ, Cychrus, Carabus and Calosoma. Will give liberally in exchange. GEO. A. EHRLMAN, 2314 Sarah Street, Pittsburg, Penna.

LEPIDOPTERA.—I have a large number of both mounted and papered specimens for exchange. All are 1900 captures. Correspondence in both English and German. Address: A. KWIAT, 701 Larrabee St., Chicago, Illinois, U.S.A.

LEPIDOPTERA, in papers, of Canada and U. S. A., wanted in good exchange for fine Lepidoptera of Europe, Asia, South America. I take only first-class quality. Please to write Smith's number upon the paper. WILHELM NEUBURGER, Lepidopterist, Berlin, S. 42, Luisen-Ufer 45, Germany.

COLEOPTERA.—Will exchange Canadian Coleoptera, in papers, for Coleoptera of U. S. and Canada. Please send lists. C. J. OUELLET, Deaf and Dumb Inst., Ville St. Louis, Montreal, P. Q.

The Canadian Entomologist.

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No. 11

TWO NEW SPECIES OF LUCANIDÆ FROM CALIFORNIA.

BY H. C. FALL, PASADENA, CALIF.

Some two years ago I received from Mr. E. A. Schwarz a single example of a curious Lucanide bearing labels "Kaweah, Cal.," and "*Ceruchus* (?), n. sp." This specimen, as I have since learned, was one of a considerable number taken by Mr. Ralph Hopping six years ago on grain and wild grasses growing near the grain on a small sandy hill at the locality indicated. In a letter just received from Mr. Hopping, he states that he has this year taken four fresh specimens, May 17-20, at the same place, one flying in the bright sunshine shortly after noon, the others at twilight. Mr. Hopping has kindly sent me three more specimens, and I have seen two others in the collection of Mr. Fuchs, also from the same source. These specimens are all males, and I have little doubt that Mr. Hopping's entire catch is of this sex.

It is probable that Mr. Schwarz had given the species little or no study, inasmuch as no lengthy examination is needed to convince so experienced a coleopterist that it can not possibly be a *Ceruchus*. On further investigation it appears equally certain that it is not assignable to any of the known genera of the family. Scarcity of material, together with the small size of the insect, has prevented a satisfactory examination of the oral organs, a fact which makes somewhat difficult the determination of its affinity with described genera as at present classified. It is, however, questionable if the characters drawn from the ligula and maxillæ are of any greater significance than several others much more easily observable, and a knowledge of their precise form in the present instance would, I believe, throw little light on the relationship of this remarkable Californian species.

Following the classification adopted by LeConte and Horn, our species would, by the structure of the mentum, the straight antennæ, and the nearly contiguous front coxæ, fall into the *Ceruchini*; but the differences in other respects are too numerous and too radical to permit a

close association with *Ceruchus*, and the new form must, I think, stand as the representative of at least a new sub-tribe, which may for the present be placed between the Ceruchini and Sinodendrini.

With the exception above noted, the following generic diagnosis is believed to be sufficiently full for comparative purposes :

PHYLLOSTOMA, gen. nov.

Mentum longer than wide, narrowly rounded in front, mental suture scarcely traceable. Palpi moderate in length, their supports visible ; third joint of maxillary slightly transverse, fourth fusiform and as long as the second and third combined ; joints of labial palpi increasing in length. Mandibles small, with a conspicuous externally bidentate process. Head small, less than half the width, and with the mandibles but little more than half the length of the prothorax. Labrum connate with the epistoma, the suture very fine. Eyes very prominent, subglobular, not emarginate. Antennæ straight, first joint stout, elongate oval, second similar but smaller, forming with the first joint about one-third the length of the organ ; joints 3-7 small, becoming transverse ; club three-jointed, subequal in length to joints 3-7. Prothorax transverse, widest a little behind the middle, sides strongly rounded. Elytra a little wider than the prothorax and about twice as long, sides parallel. Front coxæ transverse, subconical and strongly prominent ; middle coxæ transverse, much less prominent ; hind coxæ flat. Legs long ; hind femora very stout ; front tibiæ strongly bidentate externally, with three or four small denticles above the upper tooth ; middle and hind tibiæ not dentate, but with a transverse ridge fringed with spinules on the outer and posterior side, the apex also fringed with short, close-set spinules ; tibial spurs as usual in the family ; tarsi unusually long. Abdomen with six distinct segments.

P. fimbriata, sp. nov.

Elongate, cylindrical, brown, side margins of thorax and elytra fimbriate with long hairs, under surface and legs sparsely hairy. Head coarsely, rather closely, punctate ; clypeus reflexed, quadridentate ; front concave at middle, the concavity limited by ridges which converge backward ; inner margin of the eyes elevated, especially posteriorly, and forming minute, but prominent, tempora. Prothorax convex, finely margined, a little wider than long, widest two-fifths from the base, sides strongly rounded, front angles obtuse but defined, hind angles wanting, the sides rounding into the base ; surface rather finely and sparsely

punctate. Elytra finely moderately closely punctate, the surface finely but not closely rugulose, owing to the irregular coalescence of the punctures; sutural stria alone evident; disc with two costæ faintly indicated anteriorly, the punctures defining them being more nearly serial in arrangement than elsewhere. The marginal fringe consists of two series of hairs, one superior and directed upward, the other epipleural and horizontal. Prosternum carinate at middle, polished and impunctate except near the side margins. Metasternum and abdomen rather sparsely punctate.

Length, 7-7.5 mm. Width, 2.8-3 mm.

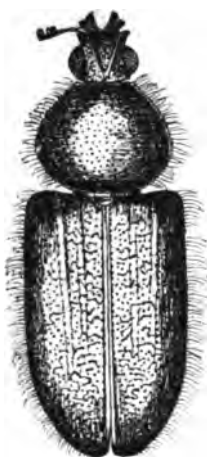


FIG. 10.

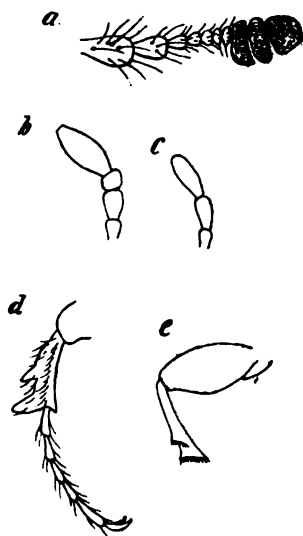


FIG. 11.

The accompanying figure (Fig. 10) represents fairly well the general aspect of the insect, but the cephalic ridges are somewhat exaggerated and the antenna is a little short. The antenna is, moreover, more correctly represented in (a) Fig. 11, while b, c, d and e illustrate respectively the maxillary palpus, labial palpus, front tibia and tarsus, and hind femur and tibia.

Platycerus latus, sp. nov.

Stout, convex, nearly black, shining. Head small, coarsely confluent punctured; mandibles small, not differing in the sexes. Scape of

antennæ nearly twice as long as the funicle, the latter slightly but distinctly shorter than the club; funicular joints, except the first, transverse, the outer ones gradually slightly wider; club three-jointed, distinctly wider in the male than in the female, its basal joint more than twice as wide as the preceding one. Prothorax large, one-half to four-fifths wider than long, widest but little behind the middle, sides strongly rounded but not angulate, deeply sinuate posteriorly, the hind angles right or somewhat acute; side margins moderately reflexed; disc closely and strongly punctate, the punctures less close toward the middle, where they are separated by from one-half to quite their own diameters. Elytra from one-third to two-fifths longer than wide, distinctly more than twice as long as the prothorax, width at base a trifle less than the latter at its widest part; disc not distinctly striate, the punctures strong, close and subserial in arrangement. Tarsi about three-fourths as long as the tibiæ in the male, scarcely more than half the tibial length in the female.

Length, 9-11 mm.

Described from 3 ♂'s and 6 ♀'s taken in Placer Co., California, and 1 ♀, apparently not different, from Alameda Co.; all collected by Dr. E. C. Van Dyke.

Latus is evidently similar in its robust convex form to *thoracicus*, Casey, but of this species Casey says: "Scape of antennæ slightly longer than the funicle, the latter a little longer than the club," while in *latus* the scape is sensibly twice as long as the funicle, and the latter is shorter than the club. In *thoracicus* the thorax is said to be widest at the basal third, which is not the case in any of the ten examples of *latus*.

The following notes, contained in a letter from Dr. Van Dyke, are of especial interest. He says, speaking of the species above described: "My Placer Co. specimens were from Forest Hill, altitude about 2,700 ft. Inasmuch as I found several about old Libocedrus stumps, and one quite well into the heart of one, I surmise that it feeds on this. I would wish to find the larvæ before being certain, though. It flies only at dusk and at night. My *P. Agassizii* were all found in broad daylight resting on leaves or wandering over tanbark oak stumps. *P. Oregonensis* and *depressus* I have caught flying in the hottest part of the day. Our two species of *Ceruchus* are both night fliers like the new *Platycerus*. Another resemblance in habit, if it should prove true that this feeds on the Libocedrus, is the fact that both species of *Ceruchus* feed on conifers. All the other species of *Platycerus* that I have observed feed on non-

coniferous trees; *P. Oregonensis* on California laurel and alder and on Madrone (Rivers); *P. depressus* on the California mountain Aspen, and *P. Agassizii* on oak, the tanbark—*Q. densiflora*—preferred, though I have found it on the live oak—*Q. agrifolia*."

NEW DIURNAL LEPIDOPTERA FROM BOLIVIA.

BY A. G. WEEKS, JR., BOSTON, MASS.

(Continued from page 269.)

Pedaliodes primera, sp. nov.

Habitat: Bolivia, near Cusilluni. Expanse, 2.25 inches.

Head and palpi, dark brown, nearly black. Antennæ, above, nearly black; beneath, dark rust colour. Legs, brownish. Thorax, black with brownish hairs. Abdomen, the same but lighter beneath.

Upper side of fore wings, entirely dark blackish brown. The hind margins are dentated, especially so on lower wings. The marginal interspaces of fore wings have a prominent white thread.

The ground colour of under side of fore wings is dark brown. The marginal interspaces have a prominent white thread. There is a silvery-white dash near apex, starting on costa, practically at the apical point, extending towards base for one quarter inch and suffusing into the wing for one quarter inch. Below this is an interspacial white speck. Nearer the base, one sixteenth inch inwards from this silvery-white area, the subcostal interspaces show whitish owing to a generous dashing of white scales. The discoidal space is rather light rusty brown, suffusing into lower interspaces. Under the first disco-cellular nervule, practically in the centre of hind marginal area, is a rusty circle, one quarter inch across, of same colour as discoidal space. Inner margin is somewhat grayish.

Ground colour of under side of hind wings is dark brown with dashes and wavy lines of silvery white, hard to describe accurately. The lower third of the wing, covering anal angle area, is heavily covered by silvery-white scales, and between the second and third median nervules, one-third inch from hind margin, is a prominent white dot, repeated in next lower interspace, but smaller. Above the anal area which bears the silvery-white scales, and inwards toward base, the ground colour is

transversely crossed by a more or less prominent series of silvery-white wavy lines, interspacial. Midway between base and apex on costa, is a prominent dash of silver white, repeated directly below in the next subcostal interspace, and half way from this to base is another dash of silvery white. The discoidal space at its outer portion has two patches of silver-white scales, the balance of the space being of the ground colour, with a suggestion of silvery-white, transverse, wavy lines. The interspaces, one-quarter inch within hind margin, bear a white speck, wanting in some specimens, but fairly prominent in others.

The general marking of under side varies greatly in the eight specimens in my collection. The prominent and most regular markings are the silvery-white space near apex of fore wings, the rust colour of discoidal space (which in some specimens suffuses very generously into adjoining interspaces), the subcostal silvery-white dashes on hind wings, and the silvery-white anal area with the interspacial white dots.

Taken near Cusilluni in May, 1899, and although one or two specimens have been found in European collections, I believe no description has ever been published.

Thecla Harrietta, sp. nov.

Habitat: Bolivia, near Corioco. Expanse, 1.50 inches.

Head, thorax and abdomen above, dark, covered with green-blue hairs; below, dark mouse colour. Antennæ, black. Legs, dark mouse colour, tarsi having white annulations at base of each joint.

Fore wings, above, dark lustrous blue. Basal area dusted with greenish blue. Hind margin with a slight fringe of black hairs, and edged with a black thread. A slight suffusion of black extends one eighth inch inwards from hind margin.

Lower wings, above, dark lustrous blue, matching fore wings. Hind margin, same as on fore wings. At anal angle is an addition to the wing area, one sixteenth inch wide, running from angle to lower submedian nervule (black suffusing somewhat into wing area) and then extending outwards as a tail at nearly right angles to the nervule. This tail is black, one quarter inch long. Across this anal black space is a bluish-white thread, running from end of lower submedian nervule straight to the submedian nervule, then forming a "V" in inner marginal space. At the end of the second submedian nervule is another tail, black, one eighth inch long, being a continuation of the nervule in its direction.

Under side of fore wings, mouse colour. Hind margin edged with a black thread. Starting at second subcostal nervule at a point one quarter distance from apex to base, is a jet-black line, running downwards parallel to hind margin, and ending at lower submedian nervule. Three sixteenths inch within this line is another running from costa to lower submedian nervule, not quite parallel to the first line but approaching it somewhat at its lower part; at the lower submedian nervule this line turns at a right angle and crosses inner marginal space. Across end of discoidal space is a black line. Nervures and nervules are somewhat darker than ground colour.

Under side of hind wings same colour as fore wings. Hind margin edged with a black thread. Beginning at costal nervure at a point one third distance from base to apex is a heavy jet-black line running downwards, *towards* anal angle, crossing subcostal nervure at its junction with first subcostal nervule, and ending at median nervure. Outside of this about one eighth inch, is a second heavy jet-black line, starting at first subcostal nervule, and running down to lower submedian nervule, striking it one eighth inch above hind margin. Another similar line starts at apex and runs downwards, one quarter inch within hind margin, joining the last-mentioned line at lower submedian nervule. Betwixt this and hind margin, but much nearer the margin, is a black line, scarcely visible at apex, but becoming more prominent as it approaches anal angle. The area at lower angle described on upper surface is black, the tails also. The blue line crossing it is the same as on upper surface. Just above this, in interspace, above submedian nervure, is a black line forming a circle, dusted with blue at its lower inside edge. In the inner marginal space are two parallel black threads, starting near base and crossing downwards to submedian nervure; the first is edged with blue on its lower side, the second edged with blue on its upper side. The nervures and nervules are black.

Type.—One specimen, taken April 19th, 1899.

Pyrrhopygopsis Reedii, sp. nov.

Habitat: Bolivia, Cochabamba District. Expanse, 2.05 inches.

Head, antennæ and legs, black. Thorax, black, with an orange spot at each shoulder. Abdomen, black, with a tawny tip.

Fore wings, above, entirely black excepting a slight dusting of orange scales on costa. Hind margin, fringed with orange hairs, short at apex, but lengthening at lower angle.

Hind wings, the same as fore wings, the orange fringe extending from upper angle to anal angle is more prominent than on fore wings.

Under side of both wings, of dark bronze. The lower half of discoidal space, darker, the dark suffusing into three lower interspaces. Nervules and nervures, black. Hind margin fringed with orange, same as on upper side.

Under side of hind wings, the same, except the darker area borders the inner margin, one eighth to one fourth inch wide, not intruding on discoidal space.

Described from species taken five days' travel north from Cochabamba. It is very near *P. tenebricosa*, Hew., except in the cilia, which is orange instead of pure white.

Pamphila argentea, sp. nov.

Habitat: Bolivia; Cusilluni District. Expanse, 1.20 inches.

Head, thorax, antennæ, abdomen and legs, bronzy-brown above; more grayish beneath.

Upper side of fore wings, bronzy brown. In subcostal interspaces, at apical area, are two whitish dots. Just above the second subcostal nervule, is a larger dot, and in interspace below, somewhat nearer base, is another still larger one, with its upper part nearer the hind margin than the lower part. In interspace below, is another longitudinal spot, of nearly similar size, resting on submedian nervure.

Upper side of hind wings, bronzy brown. In discoidal space is an indistinct lightish space, and running from near upper angle across the wing to near centre of inner margin, is a row of lightish interspacial dots, five or six in number.

Under side of fore wings, dark brown, central portion of hind margin being dashed with lighter scales. The whitish spots of upper surface are repeated.

Under side of hind wings, rich dark brown. In discoidal space is a prominent spot of silvery white. From upper angle across the wing to near the centre of inner margin is a row of silvery-white interspacial spots. These spots are very prominent, forming the noticeable marking of under side. Along hind margin of both wings, within the hairy fringe, is a dark thread.

Taken near Cusilluni in May, 1899.

NEW BEES OF THE SUBFAMILY ANTHOPHORINÆ FROM
SOUTHERN CALIFORNIA.

BY T. D. A. COCKERELL, E. LAS VEGAS, N. M.

(Continued from page 287.)

Anthophora catalina, n. sp.—♀. Length 14 millim., black (including face, mandibles and antennæ), with fulvous, yellowish-white and black pubescence. Pubescence of face dull yellowish-white, a few black hairs at the sides of the clypeus, a long pale fulvous tuft on each side of the anterior ocellus; hair of vertex long, erect and black, of occiput yellowish-white, of cheeks yellowish-white above and white below; hair of thorax pale fulvous, mixed with black on mesothorax and scutellum; lower half of pleura clothed with black hair; abdomen with dense pale fulvous hair-bands at the apices of the first four segments; apex with black hair; ventral surface of abdomen with black hair, except at the sides, where the pale apical bands of the upper surface are combined for a short distance; legs clothed beneath with black hair, above largely with pale; fringe of anterior tarsi wholly black; long hair on outer side of hind tibia and basal joint of tarsus black on the anterior half (extending longitudinally) and shining very pale yellowish on the posterior half.

Structure of *A. urbana*, Cresson, of which it is the insular representative.

Hab.—Catalina Island, California, Aug., 1901. (*Wilmatte P. Cockerell.*)

This bee differs strikingly in colour from *A. urbana*, which is common on the mainland. I found ordinary *urbana* flying on July 8th at San Pedro, which is on the coast nearly opposite Catalina.

Melissodes personatella, n. sp.—♂. Length 10 millim.; black; head much broader than long, facial quadrangle somewhat narrowed below; *face entirely black*, covered, as also the cheeks, with long white hair; mandibles black, with a ferruginous subapical spot; vertex on each side of the ocelli concave, smooth and shining, with minute, hardly noticeable punctures; *antennæ very long*, reaching to apex of second abdominal segment; scape short and stout, black; flagellum ferruginous beneath, second joint considerably longer than third; mesothorax shining and sparsely punctured, thinly clothed, as also the scutellum, with long black hair; hair on prothorax, pleura, post scutellum and metathorax

long and white; tegulæ very dark brown; wings rather short, slightly dusky, more hairy than usual, nervures piceous; first recurrent nervure received by second submarginal cell not far from its end; third submarginal narrowed a little more than half to marginal; legs black, with white hair, small joints of tarsi becoming ferruginous; abdomen with short black hair, except on the first segment and extreme base of second (where it is white), at the apex (where it is pale), and clear white bands of hair near the apical margins of segments two to five; the first segment has some black hair dorsally near its apical margin; apical plate truncate, not notched at the sides.

Hab.—La Jolla, San Diego Co., Calif., August, 1901. A very distinct species, by its black face, black hair on mesothorax, and long antennæ. For some account of other species with black faces in the male, see Entom., Oct., 1896, p. 304.

NOTES ON THE EARLY STAGES OF CATOCALÆ.

BY G. M. AND E. A. DODGE, LOUISIANA, MO.

(Continued from page 226.)

Catocala relecta, Grt.

Food-plant, hickory. Length of mature larva, two and one-half inches. Head rather flat, as broad as first segment, gray striped with dark brown, and with a broad black band, ragged in front, running up each side to top of lobe, but not continued over the summit.

The dorsal stripe consists of a series of rounded, brown patches with a black central line; tubercles, although not large, tipped with white, and conspicuous; subdorsal stripes brown, interrupted and indistinct.

The thoracic segments are blackish; on the fourth segment a pale brown band, much lighter than the general colour, crosses the body; the central segments are also blackish, but a shade paler than the first three; there is a slight black transverse ridge on the eighth segment, and the anterior part of this segment is pale brown like the fourth; the remainder of the eighth segment and all following are as black as the thoracic segments, except that the pale brown dorsal stripe is unusually developed on the eleventh segment. Filaments whitish, very numerous, simple and hair-like, but not very long. Venter white, tinged with pink, with large

black spots on all except the thoracic segments and segments eight and nine.

Catocala piatrix, Grt.

Larva taken on walnut, July 9, 1901. Length, two and seven-tenths inches. Colour pale gray, head the same, face dusky, bounded by a black stripe which passes over the summit and down each side to the mouth, the sides of head behind this stripe being pale gray. A rather broad, brown, continuous dorsal stripe. Cervical shield dark like the face, anal plate greenish. Brown stripes enclosing the dorsal tubercles are darkest on posterior part of each segment, where they are marked with short diagonal gray lines. Lateral stripes faint. Stigmatal stripes dark brown and distinct, fading on central segments. No filaments. Tubercles all very small and white, legs greenish.

Venter white, with a black spot on each segment except that bearing last pair of abdominal legs.

Catocala neogama, S. and A.

Described June 2nd. Food-plant, walnut. Head wide as thoracic segments, gray, as is also segment one; head with many dark brown markings; jaws black and a black patch at each side of the mouth.

Tubercles whitish, those on eleven quite large, ridge of eight slight. Dorsal median stripe very irregular; on the thoracic and anal segments its sides are nearly straight and closely approximate, on the central segments it alternately widens and contracts, forming a series of dumb-bell-like figures.

The subdorsal stripes are of the general colour, which is wood-brown, except on segment four, where they are black, and also on segment eight, where they form part of the transverse black band, which latter is divided by the dorsal stripe.

The stigmata are black and like in the dark brown stigmatal stripe, which is connected with the subdorsal stripes by dark diagonal lines on each of the central segments.

Filaments simple, not numerous. Legs pale, spotted with black and white. Venter strongly tinged with red and with black spots, except between thoracic and last two pairs of abdominal legs, where the spots are brownish red or, in some cases, obsolete.

Neogama larvæ vary in depth of colour, but the markings are quite constant, so far as observed, and we have bred many of them.

Piatrix larva may be recognized from its earliest stage, showing the

markings of the mature larva, but it also varies somewhat in depth of colouring.

The most constant of all is the larva of *illecta*, which at any stage after the first day or two may be recognized by its black and white, narrow and transverse stripes, its broad, white stigmatal stripe, and the spots, like red sealing-wax, which ornament each segment.

We bred over one hundred *illecta* this year, and noted no variation in either larva or imago.

NEW SPECIES OF EVANIIDÆ.

BY WILLIAM H. ASHMEAD, ASSISTANT CURATOR, DEPARTMENT OF INSECTS,
U. S. NATIONAL MUSEUM.

Mr. J. Chester Bradley has begun, in the May number of the "Entomological Student," a monographic revision of the *Evaniidæ* of North America, a work badly needed by our students.

On learning from me that I had several new species in this family, he has requested that I should publish them at once, so that they may be incorporated in his monograph, which will be published in the Transactions of the American Entomological Society of Philadelphia.

I begin, therefore, by publishing three new species in Abbe Provancher's rare genus, *Pammegischia*, a genus suppressed by Dr. Schletterer, but revived in my classification of the superfamily Ichneumonoidea.

It is interesting to record that the habits of this genus are quite different from other Evaniids; Dr. E. P. Felt, State Entomologist of New York, having bred a species from the larvæ of a horn-tail *Xiphydria Provancheri*, Cresson.

Mr. Bradley has done me the honour to accept my ideas on the classification of the *Evaniidæ*, but has been unfortunate in not paying more attention to the characters used in separating the genera, for he has placed in the genus *Aulacus* species which should be placed in Abbe Kieffer's genus *Pristaulacus*, viz., *Aulacus occidentalis*, *A. melleus*, *A. pacificus*, *A. rufitarsis*, *A. fasciatus*, *A. firmus*, *A. resutorivorus*, *A. Abbottii*, *A. stigmaterus* and *A. pallipes*.

Pammegischia xiphydrie, sp. nov.

♀.—Length, 7.5 mm.; ovipositor about two-thirds the length of the abdomen. Black, with the first segment of abdomen red, the second

joint of front trochanters, the middle trochanters and basis of their tibiæ testaceous, the rest of the legs remaining black (all being broken off about the middle of the tibiæ). The head is quadrate, above smooth and highly polished, with only a few scattered punctures; in front, below the front ocellus to the insertion of the antennæ, it is transversely rugulose; face beneath the antennæ, except the lower inner angles of the cheeks, which are smooth and polished, is closely irregularly punctate; mandibles black, with a rufo-piceous tinge; while the palpi are fuscous. The thorax is rugosely punctate, the mesonotum with numerous transverse ridges and with complete parapsidal furrows. Wings almost hyaline or only faintly tinged, the stigma and veins being black or brown-black, the first recurrent nervure being received by the first cubital cell at about the middle, the second recurrent nervure received by the second cubital cell a little beyond its middle, while the third cubital cell is more or less divided into two by a spurious stump of a vein which originates from the cubitus a little before the apex of the second recurrent nervure. All coxæ are black and rugulose, the hind pair being elongate and produced beneath at apex into a triangular process that extends far beyond the insertion of the trochanters. The abdomen is highly polished, impunctate, except at the extreme base, and is shaped as in *Aulacus*, only it is not so distinctly petiolate; the first segment occupies fully half the whole surface of the abdomen.

Type.—Cat. No. 5782, U. S. N. M.

Hab.—Saranac Inn, New York.

Host.—Hym.: *Xiphydria Provancheri*, Cresson, living in birch.

Bred by Dr. E. P. Felt, State Entomologist of New York.

Pammegischia Lovei, sp. nov.

♀.—Length, 4 mm. Ferruginous; eyes, mesonotum, base of metathorax, hind coxæ toward apex, the flagellum and the ovipositor, which is a little longer than the abdomen, brown or brown-black; all femora and the hind tibiæ, except at base, dusky, rest of legs honey-yellow. Wings hyaline, the subcostal vein brown, the stigma and rest of veins pale ferruginous.

Type.—Cat. 5857, U. S. N. M.

Hab.—Palisades, New Jersey. Taken in May by Mr. E. E. Love.

Pammegischia Weedi, sp. nov.

♂.—Length, 5.5 mm. Black; face below insertion of antennæ, mandibles except teeth, first joint of antennæ, first segment of abdomen

except extreme base and apex, and legs except coxæ, pale ferruginous or honey yellow.

Antennæ straight, as long as the body; brownish and 13-jointed, the second and third flagellar joints subequal, nearly twice as long as the first. The head is nearly smooth, the face below the front ocellus transversely rugulose, the cheeks feebly punctate; the thorax is rugoso-punctate, the mesonotum with coarse transverse rugæ; the abdomen is smooth and polished, the three or four terminal segments at apex and the claspers being rufo-piceous, while the wings are hyaline, with the stigma and veins ferruginous.

Type.—Cat. No. 5858, U. S. N. M.

Hab.—Hanover, New Hampshire. Captured by Dr. Clarence M. Weed.

HYPTIA Illiger.

Hyptia Fuchi, new species.

♂.—Length, 5.5 to 6 mm. Ferruginous, the abdomen, except the petiole or first segment, being black; the forehead from the ocelli to the base of the antennæ, except the orbits, is black or blackish; the pro-mesosternum, the meso- and metapleura, all coxæ except the hind pair toward apex beneath, the trochanters and the hind legs, are black, while the middle femora above and the hind tibiæ toward apex, and the flagellum, except the three or four basal joints beneath, are fuscous. Wings clear hyaline, without cells, the stigma, the costal and subcostal and the median veins being brownish-black.

Type.—Cat. No. 6075, U. S. N. M.

Habitat.—San Jose del Cabo, Baja, California.

Described from 2 ♂ specimens received from Mr. Charles Fuch.

Hyptia Weithi, new species.

♂.—Length, 5 mm. Black and coarsely closely umbilicately punctate, the metapleura coarsely reticulate, the scape, the prothorax, upper part of the mesopleura anteriorly, the mesonotum, the scutellum, the anterior legs from apex of coxæ, and the middle tarsi, testaceous; rest of legs black. Wings hyaline, the veins black, the discoidal cells entirely obliterated.

Type.—Cat. No. 6076, U. S. N. M. (Ashmead Collection).

Habitat.—Hayti.

Described from a single specimen received from Mr. R. J. Weith.

Hyptia Trinidadensis, new species.

♂.—Length, 3.5 mm.—Black; the head except the face below the antennæ, the mesonotum and the mesopleura, are smooth, polished and impunctate; the metathorax is rather closely punctate, the metapleura more coarsely punctate; the face below the insertion of the antennæ is rather finely punctate, and one may detect a few small punctures on the forehead; the antennæ, except some dark stains at the apex of the joints, the front coxæ, their femora beneath and their tibiæ and tarsi, middle trochanters except at apex, an annulus at base of their tibiæ, the hind coxæ except at apex, base of first joint of trochanters, all tibial spurs, and an annulus before the apex of the abdominal petiole, all yellow-testaceous; rest of legs black. Wings clear hyaline, the stigma and veins brownish-black, the discoidal cells wanting.

Type.—Cat. No. 6077, U. S. N. M. (Ashmead Collection).

Habitat.—Trinidad, W. I.

Described from a single specimen.

Hyptia Floridana, new species.

♂.—Length, 2.5 to 2.75 mm. Wholly black, except the sutures of the joints of the middle and front legs, their tarsi and all tibial spurs, which are testaceous. The head and the mesonotum are distinctly punctate, but more sparsely punctate on the vertex and on the disk of the mesonotum; the mesopleura anteriorly are smooth and polished, while the metathorax, except sparsely on the disk, is coarsely umbilicately punctate. Wings hyaline, the tegulæ yellowish, the veins brownish.

Type.—Cat. No. 6078, U. S. N. M. (Ashmead Collection).

Habitat.—Jacksonville and Biscayne Bay, Florida.

Described from 2 specimens. The specimen from Biscayne Bay was collected by Mrs. Annie Trumbull Slosson.

Hyptia Johnsoni, new species.

♂.—Length, 5 mm. Black, except the metanotum above and surrounding the abdominal petiole. The head and thorax are distinctly but not closely punctate, the punctures being separated; the face has a sericeous pubescence; the mesopleura are smooth, polished and impunctate, except a few, minute, faint punctures toward the coxæ; while the wings are hyaline, without discoidal cells, the tegulæ and the veins being black or brown-black.

Type.—Cat. No. 6079, U. S. N. M. (Ashmead Collection).

Habitat.—Philadelphia, Pa.

Described from a single specimen received from Mr. C. W. Johnson.

*EVANIA Fabricius.**Evania Neomexicana*, new species.

♂.—Length, 3.5 mm. Black, the metathorax at apex and sometimes the mesopleura below, rufo-testaceous; the head and the mesonotum are shining and only sparsely punctate; the mesopleura superiorly are smooth and impunctate, but posteriorly they are lineate, and below, or toward the mesosternum, they are sparsely punctate; while the metathorax is rather coarsely and irregularly reticulate. Wings hyaline, the tegulæ, stigma and veins being black or piceous, the internal veins sometimes brown.

Type.—Cat. No. 6080, U. S. N. M.

Habitat.—Las Cruces, N. Mex.

Described from 2 specimens received from Prof. T. D. A. Cockerell.

Evania Californica, new species.

♂.—Length, 4.6 mm. Black, the face around the insertion of the antennæ, the clypeus, the mandibles, the sutures of the trochanters, the tibial spurs, front knees, base of front and middle tibiæ and the sutures of their tarsal joints or the front tarsi beneath, testaceous or brownish. The head and the thorax above are smooth and impunctate, or at most with only a few minute, scarcely perceptible punctures; the prothorax at the sides is lineate; the mesopleura, except a small, smooth spot, are reticulate and lineate superiorly, while the metathorax, except *above*, is rather coarsely reticulate. Wings hyaline, the tegulæ testaceous but browish basally, the veins being brown-black.

Type.—Cat. No. 6081, U. S. N. M.

Habitat.—Natoma, Southern California.

Described from a single specimen taken by Mr. Albert Koebele.

Evania unicolor, Say.

This species I have recently recognized, and it is certainly distinct from *E. appendigaster*, Linne, although agreeing with it very closely in size and colour. It was described by Say long before railroads were built and before *Evania appendigaster* could have reached the interior of the country.

It is readily separated from *E. appendigaster* by punctuation and sculpture, the head being distinctly punctured and clothed with a sericeous pubescence, whereas in the former it is smooth and impunctured.

NOTES ON THE BUTTERFLIES OF SIOUX COUNTY,
NEBRASKA.

BY MERRITT CARY, NELIGH, NEB.

While connected with expeditions sent out by the Department of Entomology and Ornithology, University of Nebraska, it has been the writer's good fortune to spend a portion of the summers of 1900* and 1901† in the extreme north-western corner of Nebraska in collecting the insects, birds and mammals of the region. Naturally the butterflies, the study of which has been something of a "hobby" with him for some years past, came in for no little share of attention.

That a region so interesting as Pine Ridge and the Hat Creek and White River Basins are geologically, is also of the greatest interest as regards its zoogeography and phytogeography, goes without saying. The general topography of a region, whether it be a high plateau, deeply cleft by numerous well-wooded canons, or a prairie region containing large areas of bad lands and buttes, cannot fail to have its effect upon the distribution of life, and to leave a strong impress upon the indigenous fauna and flora. Both of these conditions obtain in north-western Sioux County.

Pine Ridge, which reaches an altitude varying from 4,000 to 5,000 feet above sea level, crosses the Wyoming-Nebraska line about fifteen miles south of the north-western corner of Nebraska, and runs in a south-easterly direction through the northern part of Sioux County. On the north side the Ridge is broken up into numerous deep and well-wooded canons, and slopes abruptly into the Hat Creek Basin, 1,300 feet lower.

The latter region consists of a rolling prairie, well watered by a large number of small streams which have their sources in the canons on the north slope of Pine Ridge, and embraces large areas of bad lands and buttes.

The yellow pine (*Pinus ponderosa*) is the prevailing forest tree, and

* In 1900 the expedition was encamped in Monroe Canon, Sioux County, during the last two weeks in May, and consisted of Prof. Lawrence Bruner, J. C. Crawford, Jr., and J. S. Hunter, of the University of Nebraska, besides the writer.

† In 1901, two months, beginning with May 25th and ending with July 27th, were spent in the region, with a base camp in Warbonnet Canon, by M. A. Carriker, Jr., and the writer. Prof. Bruner and J. C. Crawford, Jr., spent a week or two each in the region.

clothes the canon sides, although in the bottoms of canons such trees as aspen, black birch, box-elder, cottonwood and a few elms fringe the streams.

It will readily be seen that the Ridge, while on the border line between the Upper Austral and Transition life zones, contains a great many elements of the latter. Among the breeding birds which belong to the Transition are Audubon's Warbler, Lewis's Woodpecker, Sharp-shinned Hawk, Western Warbling Vireo, and Solitaire; among the mammals usually occurring in the Transition may be mentioned the Yellow-haired Porcupine, Black-tailed Deer, and Beaver.

The semi-mountainous area has also a corresponding effect upon the insect fauna, and accounts for the presence of a large number of western species. The occurrence of *Argynnis hesperis*, *Phyciodes camillus pallidus*, *Satyrus charon*, *Colias Alexandra Edwardsii*, *Lycaena antiacis*, *L. sagittigera*, and *L. acmon**, *Papilio zolicaon*, *P. indra*, and *P. rutulus*, *Terias Mexicana*, and *Pamphila rhesus* in north-west Nebraska will no doubt be something of a surprise to eastern lepidopterists.

Danais plexippus, Linn.—Battered specimens numerous, but no fresh ones taken until July 10 to 25, when a new brood appeared.

Euptoieta claudia, Cramer.—Flying all the time I was in the region. Especially abundant in the Bad Lands.

Argynnis cybele, Fabr.—Common on *Monarda* blossoms in the canons, July 10 to 27.

Argynnis aphrodite, Fabr.—Several examples taken in July.

Argynnis aphrodite, var. *cypris*, Edw.—The most abundant Argynnid, flying abundantly from June 25 until July 27. Fresh specimens were taken until July 15, after which battered specimens were the order. *Cypris* was taken in the canons, on *Monarda*.

Argynnis aphrodite, var. *alcestitis*, Edw.—A very few taken in valley meadows.

Argynnis hesperis, Edw.—Four examples of this species were taken in the middle of July, on *Monarda*. They are not typical, however, the apical half of the under side of the fore wings being heavily clouded with dark ferruginous, and the under side of secondaries very dark.

Argynnis coronis, Behr. (?).—A number of examples of an Argynnid

* On August 12th of the present year the writer took several examples of *acmon* at Neligh, in north-eastern Nebraska.

were secured which are very close to *coronis*, and I temporarily refer them here.

Argynnis Nevadensis, Edw.—A number of examples on Thistle, June 25 to July 15.

Argynnis Nevadensis, var *Meadii*, Edw.—Frequenting Thistles on the Divide and damp places in the canons, June 25 to July 15. Appears to be more of an upland species than any of the preceding *Argynnis*ids.

Argynnis Edwardsii, Reak.—This beautiful species was very numerous on the Divide from June 20 to July 10, feeding on Thistle blossoms; and from July 10 to 25 on *Monarda* in the canons. *Edwardsii*, *Meadii*, *Nevadensis* and *cypris* were frequently taken on damp ground around springs.

Argynnis eurynome, Edw.—On *Monarda*, July 5 to 27. Frequent examples.

Argynnis myrina, Cram.—Damp meadows in the valley, June 27 to July 20.

Melitæa sp.—A species of *Melitæa* which is close to *Edithe* of California was very abundant on the Divide and grassy slopes of the Ridge from May 25 to June 5.

Melitæa minuta, Edw.—Two examples from damp ground in Warbonnet Canon, June 5 and July 22. In 1900 a number of specimens of *minuta* were taken.

Phyciodes nycteis, Dbl.-Hewit.—Monroe Canon in 1900, common.

Phyciodes ismeria, Bdl.-Lec.—Frequently captured in July.

Phyciodes ismeria, aber. *nigra*, n. aber.

♂—Expands 1.25 in.

Upper side black, lightly spotted with fulvous and pale ochraceous. Disc of primaries crossed by two irregular bars of fulvous, the basal bar broadest and nearly severed in the middle of the basal side by a narrow black area; the second one narrowly sinuate on right primary and a narrow straight line on the left one. The broad and sinuous discal series present in *ismeria* is entirely lost; extra-discal series consists of seven whitish ochraceous spots, the three nearest the costa being small and round, the fourth with a long, narrow prolongation towards the margin, fifth round-oblong and greatly enlarged, but the end nearest the margin concave; sixth and seventh spots large and irregular, the outer portion of the latter about two millimeters from inner angle. Basal portion of secondaries faintly suffused with fulvous scales; discal series faint;

second series large and enclosing round black dots ; submarginal lunules entirely lost. Fringes black and white.

Under side fulvous on basal portion of the disc of primaries, outer portion of disc black ; costa and portion of apex suffused with fuscous ; sixth and seventh spots of extra-discal series fulvous ; second bar across disc enlarged. Marginal arrow points much as in *ismeria*. Basal portion of secondaries greatly suffused with fuscous ; sinuate discal band as well as extra-discal portion of wing similar to *ismeria*, but former much narrower.

This peculiar melanistic aberration was taken on damp sand in the bottom of Monroe Canon, June 10, 1901. It was in company with several typical specimens of *ismeria*.

Phyciodes tharos, Dru.

Winter form *marcia*, Edw.—Common in the canons, May 25 to July 1.

Summer form *morpheus*, Fabr.—Abundant, June 10 to July 27.

Phyciodes camillus, var. *pallidus*, Edw.—One example taken July 7 on *Symphoricarpos*.

Grapta interrogationis, var. *Fabricii*, Edw.—Taken by J. C. Crawford, Jr., June 23.

Grapta comma, var. *Harrisii*, Edw.—Frequently taken on the logs at an old sawmill ; also on dead branches and trunks of trees in the canons, June 20 to July 29.

Grapta zephyrus, Edw.—The most abundant species of *Grapta*. Taken in same situations as two preceding species.

Grapta progne, Cram.—General in 1900. Monroe Canon.

Vanessa antiopa, Linn.—Infrequently met with.

Vanessa Milberti, Godt.—Four examples were taken during the fore part of June, three in Warbonnet Canon and one in an alkali meadow in the Bad Lands.

Pyrameis atalanta, Linn.—Common.

Pyrameis Huntera, Fabr. — Three examples late in July on *Monarda*.

Pyrameis cardui, Linn.—Extremely abundant from June 18 to July 27.

Junonia cænia, Hüb.—One battered specimen on *Symphoricarpos*, July 20.

Limenitis Weidemeyerii, Edw.—Common from June 1 to July 15.

Weidemeyerii was usually taken around chokecherry, but it was extremely difficult to secure specimens in perfect condition.

Limenitis misippus, Linn.—A few were secured.

Apatura celtis, Bd.-Lec.—Males were flying abundantly on July 1, and females a week or so later. This species would frequently alight on my hands or head as I was passing clumps of dead brush in the canons.

Anæa andria, Scud.—A single specimen was observed at Crawford, July 27.

Neonympha eurytus, Fab.—Abundant, July 2 to 27.

Cænonympha ochracea, Edw.—Flying abundantly, both on the Divide and in the canons, from May 25 to June 30.

Neominois Ridingsii, Edw.—From June 20 until July 15 this species was common on the Divide.

Satyrus alope, var. *nephele*, Kirby.—About a dozen perfect examples were secured in the latter part of July in the canons.

Satyrus Meadii, Edw. (?)—On July 19 Mr. Carriker reported having seen a Satyr with a large brick-red patch on each front wing.

Satyrus charon, Edw.—Common in the sage brush, July 2 to 20.

Chionobas chryxus, Dbl.-Hewit.—On Divide, May 25 to June 20, abundant.

Libythea Bachmani, Kirtl.—One example secured July 21 on *Symphoricarpos*.

Thecla melinus, Hüb.—July 15 to 29, abundant.

Thecla acadica, Edw.—Several taken in latter part of July.

Thecla liparops, Bd.-Lec.—Abundant on wild grape, same date as last.

Thecla eryphon, Bd.—A few secured in May.

Thecla titus, Fabr.—Common in July on grapevines.

Chrysophanus rubidus, Behr.—Taken on Yarrow, July 3 to 27.

Lycaena lycea, Edw.—The most abundant "blue." On the Divide this species frequented the flowers of a lupine. In the canons it was taken in damp places. Flying May 25 to July 29.

Lycaena antiacis, Bd.—May 19 to June 1, 1900, common. But two examples were secured in 1901.

Lycaena sagittigera, Feld.—Common in 1900, rare in 1901.

Lycaena shasta, Edw. (?)—A number of small *Lycaenas* were taken on gravelly exposures on the Divide early in July which appear to be much nearer *shasta* than *Scudderii*, and I temporarily refer them here.

Lycaena melissa, Edw.—Abundant in the canons, May 25 to July 15. Taken also in the Bad Lands.

Lycaena acmon, Dbl.-Hewit.—Bad Lands, May 25 to June 10. Also one July 27.

Lycaena pseudargiolus, Bd.-Lec.

Var. *marginata*, Edw.—Several examples in 1900.

Var. *violacea*, Edw.—A single ♀ in July, 1901.

Lycaena amyntula, Bd.—Common in latter part of May and early in June.

Lycaena comyntas, Godt.—Early in June, rare.

Lycaena isola, Reak.—Nearly a dozen examples were captured on damp sand in the canons, June 24 to July 29.

Neophasia menapia, Feld.—Flying abundantly about the tops of pines late in July.

Pieris sisymbri, Bd.—Several in 1900.

Pieris protodice, Bd.-Lec.—Common.

Pieris napi, var. (?)—One secured.

Pieris rapae, Linn.—But two examples were taken.

Nathalis iole, Bd.—Several seen late in June.

Anthocharis ausonides, Bd.—A single specimen in 1900, and one again in July, 1901.

Colias cazonia, Stoll.—One seen July 10.

Colias eurytheme, Bd.—Abundant.

Colias philodice, Godt.—A number in May and again late in July.

Colias philodice, var. *anthyale*, Hüb.—Mr. J. C. Crawford, Jr., secured a single example of this small variety in 1900.

Colias Alexandra, Edw.—Abundant on the Divide, May 25 to June 20. Females flying June 10 to 20.

Colias Alexandra, var. *Edwardsii*, Behr.—I secured two males in 1900.

Terias Mexicana, Bd.—On *Verbena hastata*, July 14. One specimen.

Parnassius smintheus, Dbl.-Hewit.—Frequenting gravelly exposures on the Divide, June 4 to July 6. Feeding on *Sedum stenopetalum*.

Parnassius smintheus, var. *hermodur*, H. Edw.—On June 27, Mr. Crawford secured an extremely dark ♀, which I shall refer here for the present.

Papilio Bairdii Oregonia, Edw.—I secured a battered ♂ on a high butte, July 12.

Papilio solicaon, Bd.—Common in 1900, but rare in 1901. This and the following species were usually found around the rim-rock, seldom in the canons.

Papilio indra, Reak.—Two examples in 1900, one in 1901.

Papilio polyxenes, Fabr.—One specimen.

Papilio turnus, Linn.—Uncommon.

Papilio turnus, var. *glaucus*, Linn.—One seen July 22.

Papilio rutulus, Bd.—Several seen and one secured on *Pentstemon*, July 10.

Papilio daunus, Bd.—The common *Papilio* of the region. Usually seen in the canons on hot days.

Thymelicus Edwardsii, Barnes.—A species of *Thymelicus* which appears to be somewhat intermediate between *garita* and *Edwardsii*, but much nearer the latter species, was flying abundantly over the prairie on the Divide from June 26 to July 15.

Pamphila taxiles, Edw.—On *Monarda*, June 29 to July 27.

Pamphila rhesus, Edw.—One example on the Divide, May 22, 1900.

Pamphila uncas, Edw.—Common on flowers of *Opuntia* in June.

Pamphila sp.—On *Monarda* and grapevines.

Pamphila metacometa, Harr.—Several secured on *Monarda*, same dates as last.

Pamphila metacometa, var. *vestris*, Bd.—Fairly abundant.

Pamphila sp.—Not determined.

Pamphila hianna, Scud.—Several examples in 1900.

Pamphila sp.—Not specifically determined.

Amblyscirtes vialis, Edw.—Frequently taken in June.

Pyrgus montivagus, Reak.—Abundant in the sage brush.

Nisoniades martialis, Scud.—Damp places in the canons.

Nisoniades sp.—A few were taken in similar situations to the preceding.

Pholisora catullus, Fabr.—Abundant in July.

Eudamus pylades, Scud.—Monroe Canon, late in May, 1900.

Eudamus tityrus, Fabr.—Abundant.

A REPLY TO DR. WASMANN.

BY THOS. L. CASEY, VICKSBURG, MISS.

Truth may be likened to a bull's-eye—it is much more difficult to hit than to miss. The “splitters” frequently throw their shots too high and the “lumpers” too low, and there are many other sources of aberration which cause the careless worker to miss the bull's-eye. It has sometimes been my misfortune to aim a little too high in monographic work, where the familiarity engendered by long and close investigation may have led to the assignment of too great weight to certain differential characters, but, in the case of the genera allied to *Homæusa* (Journ. N. Y. Ent. Soc., VIII., p. 53), I feel myself obliged to dissent from the views advanced by Mr. Wasmann in the September number of this journal.

Myrmobiota differs so completely in habitus from *Homæusa*, that it is only by considering the general characters of the group that it can be discovered to be allied in any way to that genus. *Soliusa* resembles *Homæusa* in general habitus, but differs profoundly in abdominal structure, the basal tergites being strongly constricted at base in the latter and unconstricted in the former. It is rather unfair for Mr. Wasmann to cite other genera, in which such and such characters become valueless, because it is well known to every biological worker that characters perfectly suitable as generic criteria in one group of species may lose all taxonomic value in another group, which may not even be far removed in the series.

It is not, however, primarily the defence of the genera in question that moves me to make this reply, but rather a singular feature, allied to disingenuousness on the part of Mr. Wasmann, which appears from some recent personal correspondence, and which reappears in the third paragraph of his article. To properly show this forth, it is necessary to reproduce the three postal cards which I have received from Mr. Wasmann during the current year. The entire text only of each card is given, the salutation and endings being omitted. The first is as follows:

“LUXEMBURG, March 5th, 1901.

“I acknowledge the receipt of your kind letter from February 20th; also your paper on *Corylophidæ*, etc., has arrived, but I could not find time to inform you of its arrival till now. Your publications will be always welcome to me; also specimens of myrmecophilous or termitophilous species, especially of those which you describe.”

Nothing occurred after this acknowledgment of the receipt of my paper containing the table of the *Homæusa* group until the arrival of the following postal and little box :

“ LUXEMBURG, May 1st, 1901.

“ Will you have the kindness to name the species of *Myrmobiota* for me, which I send you by the same post in a little box? It was sent to me by one of my correspondents, who found it with *Lasius niger*.”

It seems quite evident that the crafty wording of this missive was intended to ensnare if not to delude me, and as I had taken particular care in the paper mentioned to show why *Myrmobiota* could not be the same as *Homæusa*, the tacit assumption here implied that I did not know one genus from the other caused me to answer Mr. Wasmann rather sharply, and I informed him in positive terms that the specimen sent was in no manner a *Myrmobiota*, but a true *Homæusa*, and alluded to my recently-published paper, which I stated he could not have examined. Thereupon, I received the following postal :

“ LUXEMBURG, June 1st, 1901.

“ Having not your ‘*last paper*,’ in which you explained the differences between *Homæusa* and *Myrmobiota*, I ask you to send it to me. Your letter has come to my hands, and I learned the existence of that paper only by your note in the letter. My specimens of ‘*Myrmobiota crassicornis*’ were from Wickham too ; I am curious to know how you explain the generic difference between *Myrmobiota* and *Homæusa* now.”

My astonishment on receiving this postal can well be imagined, but I nevertheless sent him another copy of the paper, and heard nothing more until the article in question appeared in this journal.

The fact that Mr. Wasmann still adheres positively to his original theory that *Myrmobiota* is congeneric with *Homæusa*, without having even a specimen, seems to savour of that form of narrow-mindedness which occasionally comes to light, even in men of acknowledged ability and reputation—a hesitancy to correct or withdraw a statement once made, although demonstrated to be untenable. I have always admired the work of Mr. Wasmann, and regret the necessity of going into print in dispute with him, but it will probably be admitted that there is at least some justification for it in this instance.

THE COCCIDÆ OF BRITISH NORTH AMERICA.

BY GEO. B. KING, LAWRENCE, MASS.

(Continued from page 200.)

Since writing my first paper on the *Coccidæ* of British North America, a very large amount of new and interesting scale insects have been sent to me for study by Dr. Fletcher and Mr. John Dearness. In nearly every instance the twigs sent showed beyond question that the insects occurred upon the food-plants infested in injurious numbers; especially so of those found on blackberry, hazel-nut, spiræa, viburnum and oak. The following are new to the Canadian list:

Pulvinaria tilia, King and Ckll., 1898. (Native.) Mr. John Dearness sent these from Thedford, Ont., on *Cephalanthus occidentalis*. It was first recorded from Mass., found on *Tilia Americana*, *Quercus* and *Ulmus*, and described as a sub-sp. of *P. innumerabilis*, but further study proves it to be quite different from that species, and it should stand as *P. tilia*.

Eulecanium capreae, L., 1758. (Introduced.) Found on a peach tree growing in a conservatory at Dartmouth, Nova Scotia, June 20, 1901, by Dr. A. H. Mackay, of Halifax, N. S. Dr. L. Reh, of Hamburg, Germany, has sent me this species infesting the following food-plants: *Pyrus malus*, *P. communis*, *Alnus* sp., *Crataegus coccinea*, *Prunus domestica*, *Tilia* sp., and *Aesculus hippocastaneum*. The species was originally described as *Coccus capreae*, and has been recorded as *Coccus cypræola*, Dalm.; *Coccus gibber*, Dalm., and *Lecanium salicis*, Bouché. Linné described his from *Salix* sp.; it has since been found on *Salix alba* and rose in England.

Eulecanium corylifex*, Fitch, 1856. (Native.) Sent by Dr. Fletcher, infesting in a serious manner *Corylus rostrata* and *Viburnum pubescens*, growing intermingled at Aylmer, Prov. Quebec, 1901. Originally described from N. Y.

Eulecanium quercifex, Fitch, 1856. (Native.) Found on oak at Knowlton, Prov. Quebec, by Miss A. Wood. The species is a common one in the U. S., and was described from N. Y.

Eulecanium vini, Bouché, 1851. (Perhaps introduced.) Last spring I received a scale from Dr. Reh, of Hamburg, Germany, infesting *Vitis vinifera*, *Pyrus communis*, *P. malus*, *Prunus armenica*, *P.*

*The species of *Eulecanium* have hitherto been placed in *Lecanium*; it is here proposed to regard the genus as a valid one.

(*Armygdalus*) *persica* and *Robinia pseudacacia*, and on *Spiraea* and *Lonicera* sp. at Smolond, Sweden; coll. Mr. Sven Lampa. In 1851, Bouché described a scale from grapevines; his description, given to me by Prof. Cockerell, is as follows: "♀ kahforming in alten aber halbkuglig werden denkelbraum. Die Eier ohne wallige Euhüllung Lang 3 Linnen an Winstocke." The scale received from Dr. Fletcher on *Spiraea salicifolia*. I cannot separate it from those received from Germany. Bouché's specimens, however, seem to have been a little larger than those before me; but the slight difference in their size counts for little in this case. There is no doubt that this is the so-called "vine-scale" of Germany. Are these scales introduced, or are they indigenous to both Europe and North America?

Chionaspis corni, Cooley, 1899. (Native.) Found on dogwood (*Cornus stolonifera*), April 5, 1899, in a shallow, shrubby swamp at London, Ont.; coll. Dearness. This was described from Mass. in 1899, found at Reading on *Cornus paniculata* and *C. alternifolia*.

NOTES ON PREVIOUSLY RECORDED SPECIES.

The following notes are of interest, giving as they do several new food-plants and geographical range:

Eriopeltis festucae, Fonsc. Sent by Dr. Fletcher; found in the woods on *Carex pedunculata* at Ottawa. This is a new locality and food-plant.

Pulvinaria occidentalis, Ckll. This was found by Dr. Mackay, June 14, 1901, on gooseberry bushes at Dartmouth, Nova Scotia. The plants were kept covered with glass jars until the young leaves began to appear. It was under these conditions when the scales were observed. A new locality.

Eulecanium quercitronis, Fitch. Mr. John Dearness sent these on twigs of *Ulmus* sp., May 28, 1891, from London, Ont. This is a new food-plant and new locality for the species in Canada, but is a common food-plant for the species in the U. S.

(To be continued.)

CORRESPONDENCE.

CONCERNING LARVAL DESCRIPTIONS.

The July CAN. ENT. (Vol. XXXIII., p. 186) contains a full and valuable account of the larva of *Alsophila pometaria*, by W. E. Hinds. The numbering of the setæ in the figure on page 186 is unfortunately stated to

be "according to Dyar's classification." This is misleading. The essential part of that classification depends upon the homologies of the tubercles, which I indicated by certain arbitrary numbers. Of course, Mr. Hinds is at liberty to call tubercle ii.a of the thorax iv., or vii. of the abdomen vi. + vii., etc., as in his figure, or make any other numbering, but he will please not label the result "according to Dyar's classification," which it is not. No one could homologize the description on page 187 with my writings without changing the numbers. Uniformity seems desirable.

HARRISON G. DYAR, Washington, D. C.

NOT SURPRISED.

In reference to Mr. J. Alston Moffat's interesting account of the emergence of a *Telca polyphemus* cocoon, in the October number, and his query, "Is it double-brooded somewhere?" I would say that it is quite possible in localities and seasons. This year I caught a dark-coloured ♀ specimen early in May, and near the end of August I found emerging from a beautifully white and fresh-looking cocoon a light-coloured ♀. In 1898, I caught a large number of specimens at light throughout the months of May and June, and early in September found five specimens, two perfect, the other newly emerged, all resting on apple trees and distinctly paler in colour than those of the early part of the season. It struck me as remarkable, as I had seen no specimens flying during August or September, and concluded they were belated in their emergence. But on consideration it looks as if they were second broods, so hastened or prematurely emerged from their pupa state that they had not the strength and vitality of those that emerged in the proper season. Although kept alive for some time before killing, their wings crinkled up after being set, and made such unsatisfactory specimens for a collection that I threw them out. I now think that in some seasons there is a small second brood here, but so immature or weak that they do not fly.

CHARLES STEVENSON, Montreal.

THE NORTHWEST (CANADA) ENTOMOLOGICAL SOCIETY.

The third annual meeting of this Society has been convened for Saturday, November 9th, 1901, at 3 p. m., at Lacombe, Alberta, N.-W. T.

- (1) To review the past work of the Society.
- (2) To devise extension of the work.
- (3) To elect officers for 1902.

This meeting will, we understand, be of unusual interest, as prizes have been offered, two by Dr. James Fletcher, of Ottawa, and one by the Society, for competition by the young folk of Lacombe district for the best collections of insects of all orders, and the best of noxious and beneficial insects. As there are a considerable number of Agricultural Societies and farmers who are members of the N.-W. Entomological Society, this competition is a step in the right direction.

Mailed November 8th, 1901.

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PAY FEES IN ADVANCE AND SECURE ANNUAL REPORT.

The Canadian Entomologist

VOLUME XXXIII.

No. 12.

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EDITED BY

REV. C. J. S. BETHUNE,

LONDON, ONTARIO.

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EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

WANTED.—Nos. 3 and 6 of Vol. S. of the Entomological News. FRANK E. WATSON, 974 E. 168th St., New York, N. Y., U. S. A.

LEPIDOPTERA.—Fine bred specimens of *Catocala illecta* and *minuta* for exchange. Also *Nathalis iole*, *Anea andria*, etc. Want *Catocala*, butterflies and sphinges. G. M. DODGE, Louisiana, Mo.

WANTED.—American silk-producing Lepidoptera. Directions for the rearing of wild silkworms can be obtained from the author. For terms, address ALFRED WAILLY, Branksome, Upper King's Road, Kingston Hill, London, Eng.

FOR EXCHANGE.—Butterflies of this neighbourhood, for those not in my collection. Have also a number of chrysalids of *Feniseca tarquinius* for exchange. Address: WILMON NEWELL, Wooster, Ohio.

ORTHOPTERA.—Wanted, specimens and literature for exchange. FRANK E. LUTZ, Zoological Bldg., University of Chicago, Chicago, Ill.

A NEARLY complete set of U. S. Agricultural Reports for exchange for some works on Entomology not in my library. Please make offer. GEORGE B. KING, Lawrence, Mass.

LEPIDOPTERA.—Would like to receive duplicate lists of collectors in every State. Rhopalocera especially desired. JOHN & HURD COMSTOCK, 1572 Ridge Ave., Evanston, Illinois.

DIURNALS, LEPIDOPTERA.—Will exchange French butterflies, in paper, for butterflies of U. S. A. and Canada. Please send lists. PROF. J. B. A. L. LEYMARIE, 25 Boyer Lane, near Rachel Street, Montreal, P. Q.

BRITISH GUIANA.—The advertiser is now collecting insects in Guiana. Would like to hear from anyone requiring good specimens from there. R. J. CREW, Georgetown P. O., Demerara, S. A.

DIURNAL LEPIDOPTERA wanted from the W. and N.-W. States for diurnals from Central and northern South America. LEVI W. MENGEL, Boys' High School, Reading, Pa.

ACULEATE HYMENOPTERA, especially Apoidea, wanted. Will give good exchange in Coleoptera or Hymenoptera. E. S. G. TITUS, Urbana, Ill.

LEPIDOPTERA: Sphingidae, Arctiidae and Saturniidae of the world desired in exchange. Liberal exchange given. HENRY ENGEL, Box 369, Pittsburg, Pa., U. S. A.

WANTED.—Cicindelidae, Carabidae, and rare Scarabaeidae. Will give good exchange in Exotic and rare European Coleoptera (named), also Odonata and Hymenoptera from N. America. Send list to R. J. WEITH, Elkhart, Indiana.

DIPTERA wanted from Washington and British Columbia in exchange for North American Coleoptera. W. S. HUNTINGTON, 1910 N. Twenty-first St., Philadelphia.

PAPILIOS brevicauda, nitra, Oregonia, indra, female, nezahualcoyotl wanted; also Cicindelidae, Cychrus, Carabus and Calosoma. Will give liberally in exchange. GEO. A. EHRLMAN, 2314 Sarah Street, Pittsburg, Penna.

LEPIDOPTERA.—I have a large number of both mounted and papered specimens for exchange. All are 1900 captures. Correspondence in both English and German. Address: A. KWIAT, 701 Larrabee St., Chicago, Illinois, U.S.A.

LEPIDOPTERA, in papers, of Canada and U. S. A., wanted in good exchange for fine Lepidoptera of Europe, Asia, South America. I take only first-class quality. Please to write Smith's number upon the paper. WILHELM NEUBURGER, Lepidopterist, Berlin, S. 42, Luisen-Ufer 45, Germany.

COLEOPTERA.—Will exchange Canadian Coleoptera, in papers, for Coleoptera of U. S. and Canada. Please send lists. C. J. OUELLET, Deaf and Dumb Inst., Ville St. Louis, Montreal, P. Q.

The Canadian Entomologist.

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No. 12

A NEW GORTYNA, AND NOTES ON THE GENUS.

BY HENRY H. LYMAN, M. A., MONTREAL.

I use the name *Gortyna* in preference to *Hydracia* as, without pretending to be an authority upon the question, it appears to me that there is better authority for the former, as used by Mr. Grote, than for the latter. My acquaintance with the moths of this genus, which I have always admired, dates back about thirty years, but in spite of that length of time my knowledge of them up till last year was of the most meagre description, and apart from the species which has stood so long in our collections under the name *Nictitans*, and a few specimens of *Velata*, Walk., I only possessed about half a dozen specimens, mostly in poor condition, representing *Immanis*, *Stramentosa*, *Rigida*, *Nebris*, *Rutila*,* and a form which Mr. Bird believes to be new.

It may be of some interest to point out that the specimen of *Rigida* referred to was taken by me probably between 1873 and 1875, and was lent, among other specimens, for the Society's exhibit at the Centennial Exhibition at Philadelphia, in 1876, and was returned to me under the name *Purpurifascia*, *Rigida* not having been described till the following year. For some reason which I cannot understand, the two forms *Nitela* and *Nebris* have, since the issue of Grote's Check List of 1882, stood in our catalogues under the specific name *Nitela* and the varietal name *Nebris*. If the *Nitela* form were the prevailing one, with the form *Nebris* much less frequent, the position thus given them would be quite natural, but if, as I understand is the case, the two forms occur in practically equal numbers, the name *Nebris* should take precedence as

*There is some uncertainty as to whether this form is the true *Rutila*.

the name of the species, with *Nitela* as the varietal name, on the ground of priority, as Guenée described *Nebris* first and then *Nitela*, saying: "Taille et couleur de la *Nebris*, dont elle ne diffère que par l'absence complète des taches blanches, et les palpes un peu plus longs et plus ascendants."†

An additional reason for this position, if any were needed, is that *Nebris* has the typical markings of the genus, while *Nitela* departs from the type.

Another matter to which I am obliged to take exception is the giving of the name *Atlantica* by Prof. J. B. Smith to the form which had been supposed to be identical with the *Nictitans* of Europe. Speyer had recognized at least a varietal difference in 1875, and named the American form var. *Americana*, and if its specific distinctness be recognized, Speyer's name must be used, as there is no warrant under the law of priority for setting it aside.

Last year I was informed by Mr. Winn and Mr. Brainerd, between the middle and end of July, that the larvæ of *Rutilla* could be obtained commonly, boring in the burdock. I was not able to look for them at once, but went out early in August, and succeeded in finding about half a dozen bored stems, which I took home. Later, on cutting them open to see if I had anything, I found the burrows in all but one tenanted only by wood-lice and slugs, but in the last one opened I found a pupa. This I kept in the stem, under a glass shade, and about September 1st the imago emerged and proved to be new to our members, but Dr. Dyar to whom I subsequently showed it, thought it only a varietal form of *Necopina*.

Shortly afterwards I went to Europe, but did not take the specimen with me, as my trip was a hurried one, and I was afraid it might meet with some accident, but when visiting the British Museum I looked up the specimens in this genus, but could not find anything to agree with it. I naturally became much interested in the group, and through the kindness of friends, especially Mr. Henry Bird, by a few purchases and by my work during the past season, have succeeded in getting together a fair representation of most of the North American forms.

This year I again searched in the same locality, a little earlier in the season, and secured five or six of the larvæ, and succeeded in rearing five

†Spec. Gen. Noct. I., 124.

more of the moths, and as the form differs from *Necopina*, the only species with which, in my opinion, it could possibly be confused, not only in the imago, but also in the larval and pupal stages, I have no hesitation in describing it as a new species.

Gortyna Erata, n. sp.

Very similar in general appearance to *G. Necopina*. The colour of the primaries more bronzy, especially in the median space, and with a distinct purplish or sometimes dull mauve shade beyond the t. p. line.

Head and thorax similar in colour to the primaries, powdered with white atoms, as in *Necopina*; abdomen lighter, similar in shade to the secondaries, and more evenly gray. In *Necopina* the dorsal tuft is somewhat conical, and projects forward, while in *Erata* it is more transverse and slopes backward. Antennæ brown or grayish, slightly marked with whitish, springing from a whitish collar.

The wings, especially the primaries, are also somewhat powdered with white, but much less so, and, in general, less evenly so, than in *Necopina*. Of the types, the one which comes nearest to *Necopina* is No. 5, and in this the powdering is almost as even as in that species. The markings, as a rule, are obscure, especially in the flown specimens, but the t. p. line is generally fairly well marked, and the t. a. line can occasionally be made out either in whole or in part.

In five out of the six bred specimens there are a few yellowish spots or dots running in from the costa a little before the apex, and in four out of the six there are on costa of primaries four yellowish dots, the first being just above the reniform and the others between it and the pre-apical series, at about equal distances apart. The t. p. line, when strongly marked, as in type No. 6, a most remarkable specimen, is seen to be double, and sometimes, as in type No. 2, the space within the lines is more or less filled with yellowish scales.

The orbicular and reniform are generally obsolete, or, at most, indicated by dark shades only, but in type 6 both are present, the former only represented by a yellowish dot, but the latter well developed and consisting of a central curved brownish-yellow line surrounded by five or six yellowish or whitish spots of varying size and shape.

In several of the specimens there is a purplish or dull mauve shading within the t. a. line, or between it and where the basal line should be. The s. t. line, when shown, is strongly dentate, but is generally indicated merely by the difference in shade between the dull mauve within and the

bronzy shade beyond it, though its course is sometimes indicated by a few yellowish scales. The secondaries are paler than in *Necopina*, the veins dark, and generally with a discal mark and a submarginal dark shade. Both wings show a double terminal dark line, but naturally this is more evident on the lighter secondaries.

Fringes of primaries dark, slightly mottled with mauve gray, of secondaries lighter. Beneath, primaries dark brownish gray, lighter towards inner margin, secondaries dark on costal margin and especially at apex, the rest lighter, with a dark discal spot and median line. Both wings more or less powdered as above. Feet brown, fore tarsi marked with whitish.

Expanse 32 to 43 mm.

Described from nine specimens, 4 ♂ and 5 ♀, six bred by me between August 24th and September 6th and now in my collection, and three, Nos. 7-9, captured by Mr. Winn on September 10th and 14th, which are in his collection.

The food-plant of the larva, as already mentioned, is burdock (*Arctium Lappa*, L.), and the larvæ when found were apparently in the penultimate stage. I intended to make a detailed description, but being exceedingly busy, delayed too long, and when I removed them from their burrows for this purpose I found that they were mature, and, as is usual in this genus, the markings had become too obscure for any description to be of value.

I noticed, however, when I found them that the dorsal and subdorsal lines were continuous, thus differing from *Rutila*, in which only the dorsal line crosses the dark space on the first four abdominal segments, and *Necopina*, in which not even the dorsal line crosses this space.

Pupation sometimes took place in the burrows and sometimes not.

The difference in the pupæ of the two species is also marked, as in *Necopina* there is a frontal tooth-like development, which, as Mr. Bird suggests, appears to be an indication of what occurs in *Ochria*, where a distinct clypeal spur exists, but this is absent in *Ærata*, as I was able to verify through his kindness in sending me some pupæ of *Necopina* for comparison.

It is perhaps hardly necessary to add that the specific name which I have given is from *aratus*—overlaid or covered with bronze—from the prevailing bronzy appearance of the primaries.

NEW DIURNAL LEPIDOPTERA FROM SOUTH AMERICA.

BY A. G. WEEKS, JR., BOSTON, MASS.

*(Continued from page 296.)**Pythonides hirta*, sp. nov.

Habitat: Bogata district, Colombia. Expanse: 1.50 inches.

Head, palpi, thorax and abdomen above, dark mouse colour; beneath, nearly white. Between the eyes are three white dots. Antennæ black. Legs grayish white.

Upper side of fore wing dark mouse colour. There is a broad prominent yellowish-white band extending from costa down to submedian nervure, its inner edge straight, the outer edge swelling outwards somewhat. The interspaces between this distinctive band and the hind margin, also the interspaces upwards towards costa, are heavily dusted with light mouse-coloured scales. The nervures and nervules are nearly black. The hind margin bears a slight hairy fringe and a very slight darkish thread.

Upper side of lower wing dark mouse colour. There is a broad white area covering central half of costa and extending downwards to the median nervure, suffusing somewhat towards hind margin. Outside of this area the interspaces show a little lighter shade than the ground colour. The nervures and nervules are dark. The hind margin has a slight hairy fringe and a very slight darkish thread.

The yellowish-white band of fore wing and the white band or area of lower wings form the prominent marking of upper surface. The rest of the wing is of dark colour, with the slight variations above noted.

The under side of fore wing is divided between white and dead mouse colour. The basal portion within a line drawn from centre of costa down to lower angle is white. The rest of the wing (the apical area) is dead dark mouse colour, the interspaces showing white dashes starting at subcostal interspaces midway between the apex and the edge of the white area. The hind margin has a hairy fringe and a darkish thread.

The lower side of hind wing is white, excepting a broad hind marginal border of dark mouse colour, which suffuses upwards towards base as it reaches the anal angle. At the upper angle there is a sugges-

tion of a white line running through this border just within the margin, but it is very indistinct. The hind margin has a slight hairy fringe of mouse colour and a darkish thread. In some lights the basal area of both wings shows a bluish-gray tinge. The prominent bands of the upper side also show slightly, owing simply to transparency.

Type.—One specimen taken in 1896. A duplicate of this species was found in the Godman collection unnamed, and undoubtedly it has never been described.

Thecla Francis, sp. nov.

Habitat ; Bolivia, near Alezuni. Expanse : .88 inch.

Head, thorax and abdomen above, black, with grayish hairs ; below, grayish white, with yellowish tinge towards end of abdomen. Antennæ above, nearly black, with white annulations at base of each joint ; below, lighter, nearly white towards club. Club somewhat tawny. Legs grayish white.

Upper side of fore wing dead grayish-brown. The area bordered by a line drawn from base up median nervure, thence to a point midway between end of discoidal space and hind margin on first discoidal nervule, and thence straight down to inner margin, shows a decided purplish lustre, evident in almost all lights. The angle at apex and also at lower angle is quite sharp.

Upper side of lower wing the same, except that the lustrous area covers entire wing, barring the costal region and inner marginal edge. The lustrous area is also less purplish than on fore wings, having a more bluish tinge. The hind margin is bordered by a dark thread. At end of submedian nervure there is a short, stumpy tail, not threadlike, but rather a jutting out of the wing area. The nervures and nervules are distinctly darker than ground colour.

Under side of fore wing dead grayish-brown, of a lighter shade than upper surface. One-third distance from apex to base there is a very slight suggestion of a line of interspatial whitish lines, extending downwards parallel to hind margin. It is scarcely perceptible, however.

Under side of hind wing of the same ground colour as fore wing. The whitish line extends downwards to anal angle, being no more prominent than on fore wings, scarcely perceptible. Just above the lower submedian nervule, close to the margin, is a semicircle of light tawny, not

a all prominent, but quite perceptible on close inspection. The basal area of the wing is dusted with dark scales.

Type.—One specimen taken August 8th, 1899.

Nisoniades tihoneta, sp. nov.

Habitat: Bolivia, near La Paz. Expanse: 1.75 inches.

Male.—Head, palpi, thorax and abdomen above, black, with brownish hairs; beneath, black, with red-brown hairs. Antennæ above, black; beneath, lighter, turning to yellowish white at club. The abdomen has a red-brown end.

Fore wing above blackish-brown, with a few lighter hairs in basal area. Near end of discoidal space is a jagged white spot. Midway between this and apex are three subcostal interspacial white dots. On a line drawn from apex down to centre of inner margin is a series of white spots, five in number. The first is scarcely visible, and under it, in next interspace, is a larger spot; below this and nearer the base is another of about the same size; below this and nearer the base is another much larger one; below this and nearer the base, resting on submedian nervure, is another directly under the white discoidal spot. Running from end of discoidal space, starting just inside of the largest white spot, is a distinct white line, ending at submedian nervure and having a background of blackish brown, darker than ground colour. The hind margin has a narrow fringe of hairs of ground colour, but tawny as it approaches lower angle. The white spots are transparent rather than absolutely white.

Hind wing above blackish brown, with tawnyish hairs covering basal area. On a line drawn from upper angle across to the centre of inner margin are four interspacial elongated transparent white spots, the first under the first subcostal nervule, and the rest following in the consecutive interspaces. The fringe of hind margin is tawny, narrow at upper angle, but broadening towards anal angle, and becoming quite prominent.

Under side of fore wing duplicates the white spots of upper surface, the lowest spot showing more whitish. The apical area extending half way toward the base is brown, tending to dark brick red. The interspaces just within hind margin are heavily dusted with grayish scales from apex half way down to lower angle, forming quite a prominent feature. The basal area is blackish. Fringe of hind margin is the same as on upper surface. The white line of upper surface running from end of discoidal space downwards does not appear on under side.

The ground colour of under side of hind wing is brown, tending to dark brick red. From the centre of costa, extending transversely across to submedian nervure, is a band or area heavily dashed with grayish or whitish scales bending towards base at its central portion. The transparent white spots of upper side are repeated. The two interspaces towards inner margin are dusted with whitish scales, giving an appearance of a continuation of the spots. The hind margin has a fringe of tawny hairs, becoming quite prominent towards anal angle. Within the margin for upper half of wing, the interspaces are heavily dusted with grayish or whitish scales. The inner margin is reddish brown, the two interspaces above being blackish.

Female.—Identical with male, excepting the absence of the white line and its dark ground on fore wings.

Described from specimens taken April 5th, 1899. It is very closely allied to *N. macareus*, Herr Schaff.

A CHANGE OF NAME.

I have been promptly informed by Prof. Cockerell that the name *Phyllostoma*, used by me in the November number, page 290, for a new genus of Lucanidæ, is already in use for a genus of bats. I would therefore propose in its stead *DIPHYLLOSTOMA*. It has become a matter of no small difficulty to select for a new genus a significant name, which has never been used in any department of zoology, and for this reason there is some excuse for the custom in vogue among certain authors of using for generic titles purely meaningless, but euphonious, combinations of letters, or various permutations of the letters in the names of older allied genera. This method of coining generic names certainly possesses the merit of simplicity, since they can be evolved in any required quantity at a moment's notice and with practically no danger of preoccupation. Personally, the custom seems deplorable for several reasons, but I am not disposed to deny that it may be defended on other grounds than expediency.

H. C. FALL.

THE LIFE-HISTORY OF *ARCTIA VIRGUNCULA*, KIRBY.

BY ARTHUR GIBSON, DIVISION OF ENTOMOLOGY, CENTRAL EXPERIMENTAL FARM, OTTAWA.

On the 22nd June, 1901, I received from Mr. A. Kwiat, of Chicago, a batch of eggs of *Arctia virguncula*, Kirby. These eggs were laid on the 18th June and hatched on the 25th and 26th. The following notes on the early stages of the species were taken. A brief description of the mature larva was published by Mr. Coquillett, in the first number of *Papilio*, in 1881.

Egg.—0.8 mm. in diameter, semi-ovoid, about as high as wide, shiny, creamy white at first; before hatching, a shiny lead colour. Under a lens the egg has a reticulated appearance and is slightly concave at base.

Stage I.—Length, 2 mm. Head 0.4 to 0.45 mm. wide, rounded, rather deeply depressed at apex, upper inside portion of cheeks black, shiny; clypeus and lower part of face brownish, ocelli black, mouth-parts blackish; hairs on face, some long and some short, pale and black. On each segment of body is a transverse row of shiny black tubercles. Tubercle i very small, ii and iii large, iv and v smaller than ii and iii; ii, iii, iv and v are surrounded with a wide blotch of reddish-brown. The colour of the skin at first is a dirty cream; after feeding, the larvæ are pale greenish. The reddish blotches surrounding the tubercles give the larvæ a reddish appearance, and the skin in the centre of dorsum against the reddish blotches appears as a dorsal stripe. The hairs from the tubercles are long and slender, those on dorsum being black, while those from lateral and lower tubercles are pale. Thoracic shield black, bearing small black tubercles. Thoracic feet and prolegs semi-translucent, slightly darker exteriorly than ventral surface.

On the 28th June all the larvæ were swollen, and by the morning of the 29th had passed the first moult

Stage II.—Length, 4.2 mm. Head, 0.55 to 0.6 mm. wide, shiny, shaped as before; upper portion of cheeks blackish, lower portion and clypeus brown, mouth-parts reddish brown, hairs on face long and slender, mostly black on upper portion, pale on lower; some heads have more

black than others. Just after moulting, in general appearance the larvæ are black, but after a day the skin is of a shiny, semi-translucent greenish tint, and the tubercles are each in a field of pale reddish-brown, which, as in Stage I, gives the larvæ a reddish appearance. The dorsal stripe is distinct, of a pale bluish-green colour. The tubercles are large (i very small), shiny black, the dorsal series bearing a bunch of short, barbed, black bristles. Tubercle ii has a shining base. The bristles from lateral and lower tubercles are pale, rather reddish. Spiracles black and very small. Thoracic shield not so conspicuous as in Stage I. Thoracic feet and prolegs concolorous, darkened at tips.

On the 2nd July some of the larvæ passed the second moult, others on the 3rd and 4th.

Stage III.—Length 6.5 mm. Head, 0.8 to 0.9 mm. wide; almost whole upper surface of cheeks dark shiny brown, clypeus and lower portion of cheeks pale—of a yellowish-brown tinge,—mouth-parts blackish, or dull reddish; hairs on face long and short, the long ones mostly black, short ones pale; ocelli black, antennæ brownish, the basal half pale. In general appearance the larvæ in this stage are dark brown. On examination with a lens, the skin is seen to be greenish, covered with brown blotches. The dorsal stripe is pale blue and distinct. The tubercles are shiny black, i very small, ii very large, with a polished base, iii slightly smaller than ii, and iv slightly smaller than iii. Bristles from tubercles distinctly barbed. The colour of the skin between tubercles ii and iii, and iii and iv is yellowish, with a slight reddish tinge. The bristles from dorsal and lateral tubercles are mostly black, but these tubercles also bear a few pale bristles. The bristles from ventral surface are pale and shorter. The dorsal tubercles on segments 12 and 13 bear a few very long bristles. The spiracles are very small, black and close in front of tubercle iv. The thoracic feet and prolegs are concolorous with venter, but are darkened in front.

During the morning of the 6th July a few specimens passed the third moult; others moulted on the 7th, 8th and 9th.

Stage IV.—Length, 10 mm. Head, 1.2 to 1.3 mm. wide, depressed at apex, lobes almost wholly black, space on sides of cheek, just above ocelli, pale brownish; lower front of face brown, with the exception of central portion of clypeus, which is blackish; antennæ brown, pale at base; ocelli black, mouth-parts as before. The larvæ in general

appearance are now deep black, with reddish bristles from lower lateral and ventral tubercles. The dorsal stripe is pale bluish, indistinct in most specimens. The tubercles are large (i small), shiny black, bristles barbed; all tubercles about same proportion as before, ii has a shining base. The bristles from i and ii are mostly pure black, but there are a few pale rust-red bristles intermingled. Those from tubercles iii and iv are mostly pale rust-red, but there are also a few black bristles mixed with these. The bristles from the tubercles below the spiracles are pale rust-red. Spiracles small, black. The dorsal tubercles on the two posterior segments bear a few very long bristles as before. Thoracic feet shiny jet black; prolegs, upper half concolorous with venter, lower half pale, all bearing sparse short hairs. As the larvæ increase in size during this stage, the skin loses its deep black colour, becoming more of a blackish-brown, with the venter rather paler than the dorsum.

On the 12th July about ten specimens passed the fourth moult; others on the 13th and 14th.

Stage V.—Length, 16 mm. Head, 1.5 to 1.6 mm. wide, indented at vertex as before, whole front of face shiny black, with exception of margin of clypeus at sides, which is brown; space on sides of cheek, just above ocelli, pale brownish as before, but now spotted with darker brown; ocelli black, antennæ as before, mouth-parts blackish. Skin of body wholly velvety black. The dorsal stripe has disappeared and is not present in any of the specimens (50). In most of the larvæ the bristles from tubercles i and ii are all black, but in a few specimens many of these bristles are dark reddish. Tubercle iii bears mostly black bristles, with some reddish ones intermingled. From tubercle iv all the bristles but one or two are bright rust-red. Bristles from tubercles v and vi are all bright rust-red, as well as those from ventral tubercles. Spiracles small and black as before, almost touching anterior edge of tubercle iv. Thoracic feet and prolegs as in last stage, setæ on all feet short and concolorous with bristles from ventral and lower tubercles.

On the 16th July one larva passed the fifth moult, and on the 17th and 18th many others moulted.

Stage VI.—Length, 25 mm. Head, 2.0 to 2.2 mm. wide, same as last stage, only the pale space above ocelli has larger spots. Body as in Stage V, with no markings. The reddish bristles from tubercle iv and those from tubercles below spiracles are very bright. The bristles from

tubercles i and ii in most specimens are all black, but some have one or two reddish bristles also. Tubercle iii has mostly black bristles, but also a few reddish ones. Tubercles all black as before, bristles barbed. Spiracles black. Thoracic feet black, setæ mostly pale; prolegs pale reddish, setæ concolorous with bristles from subventral tubercles.

On the 20th July one larva passed the sixth moult, another on the 21st, and others on the following days.

Stage VII.—Length, 31 mm. Head, 2.5 to 3.0 mm. wide, slightly smaller than segment 2, rounded, somewhat quadrate, depressed slightly at vertex, black, shiny, flattened in front; ocelli black, hairs on face all black, with exception of a few pale ones around mouth-parts; antennæ pale at base, dark in centre, and brownish at tip. In some specimens the median suture is pale, also the lower half of the epistoma. Skin of body in many specimens wholly velvety black; in others, same colour, but shading to grayish-black subventrally. Tubercles all black; bristles distinctly barbed. Tubercle i small, about one-third the size of ii; ii with a shining base, larger than iii; iii, iv and v about same size; vi smaller than v. Bristles from i, ii, iii and upper half of iv black, from lower half of iv and other tubercles bright rust-red. In some specimens nearly all the bristles from iv are rust-red. Spiracles black, inconspicuous, almost touching anterior edge of tubercle iv. On segments 12 and 13 there are a few long black hairs. Thoracic feet shiny black, tipped with reddish brown; setæ mostly pale; prolegs, upper portion shiny black, lower portion and claspers reddish; setæ rust-red.

The mature larva at rest is 35 mm. long, and when extended, 40 mm.

On the 28th July two specimens began to spin their cocoons; another on the 1st August, and others soon afterwards.

The cocoon is thin, consisting simply of a slight web of reddish-brown silk covering the pupa, and is enclosed in a leaf or two of the food-plant, which have been drawn together and fastened by threads of silk. Some of the specimens spun up amongst some blades of dry grass which were in the breeding cage.

Pupa.—Length, 22 mm.; width at widest part, 7.5 mm.; black, folds of abdomen faintly dull reddish; pruinose; abdomen bears sparse short, thick hairs, and is minutely pitted; thorax and wing-cases wrinkled. Spiracles dull black, faintly tinged with dark red in centre. Cremaster round, shiny black, terminating in a bunch of about 22–25 capitate dull-reddish bristles.

The first moth emerged on the 11th August, the next on the 17th August, and others on the 19th and 20th August. The average length of the pupal stage was 14 days. In the spring of 1901, the late Mr. T. G. Priddey, of Toronto, sent to the Division a few larvæ of *A. virguncula*. One of these began to spin a cocoon on the 1st May, the moth emerging on the 28th May. Another specimen which began to spin on the 5th May had changed to pupa by the 8th May, and the moth emerged on the 1st June. In these two instances it will be seen that the length of the pupal stage was much longer than that of those mentioned above. Some of the larvæ of the above brood stopped feeding about the middle of August, and acted as if they wanted to hibernate. In September they were put in a cool cellar, but by the middle of October they had all died. These were all mature larvæ, and I cannot account for their not spinning up with the others. At Toronto the writer has taken the moths commonly at light about the middle of June.

Food-plant.—The larvæ described in the present paper, as well as those received in the spring, were fed on plantain and dandelion.

A NEW GENUS OF MYRMELEONIDÆ.

BY NATHAN BANKS, EAST END, VA.

Hagen, in his "Stray Notes on Myrmeleonidæ," published in the CANADIAN ENTOMOLOGIST for 1887 (Vol. XIX., p. 210), called attention to the fact that there are several species of ant-lion-flies in this country which lack tibial spurs. He placed these species in *Maracanda*, McLach., a genus based on one species from Turkestan. McLachlan's description of the genus agrees moderately well with our forms, except in a few minor particulars. But on examining the figure of the Turkestan insect it is at once apparent that our forms are not congeneric with it. The figure [Fedtschenko's Reise in Turkestan, Neuroptera, Plate 1, fig. 1] shows that in *Maracanda* there are five or six crossveins before the origin of the radial sector, and that the first branch of the radial sector arises far beyond the end of anal vein. These characters place the genus in a different section from the species we have included in *Maracanda*.

Moreover, the figure shows that the prothorax is quite broad, and the femora are stated to be lineate with black in the description. The last joint of the labial palpus is said to be much dilated. All these characters are foreign to the species we have wrongly included in *Maracanda*; therefore it becomes necessary to propose a new genus for our species.

Cryptoleon, new genus.

Antennæ about as long as head and prothorax; pronotum rather narrow; legs rather short and not slender, no spurs, anterior tarsus about as long as the tibia; last joint of labial palpi but little swollen. Two or four crossveins before origin of radial sector; first branch of radial sector arises much before the end of anal vein; costals in a single or double series; in the hind wings the cubital fork runs parallel to the anal vein for some distance.

Type, *Myrmeleon conspersus* Ramb..

CURIOUS EFFECT OF THE ATTACK OF AN ASILUS FLY
ON COLIAS PHILODICE.

BY ALBERT F. WINN, WESTMOUNT, P. Q.

During the last week of my holidays at Biddeford, Maine, this summer, *Colias philodice* was abundant and in fine condition, and a great many were taken, in the hope that among them there might be some *C. interior*, but none of this species were found.

On July 19th, however, I noticed on the wing a yellow butterfly whose flight was most peculiar, and on capturing it, it proved to be a ♀ *philodice* in the clutches of a robber-fly (*Asilus* — sp.). Both were immediately put in the cyanide bottle, and about an hour later were folded up in the same paper, and the butterfly was not noticed as being in any way different from the usual well-known colour, but on the evening of July 24th, while looking over my captures with Mr. Chagnon, I came across these two specimens, and, to my surprise, the under side of the *philodice* was, by electric light, of a pale greenish colour. I was still further astonished to find that it was quite soft, although it had been in paper for six days, and all my other specimens were dry. I spread it, without relaxing, and it was duly taken off the boards to show to Mr. Lyman, who, I knew, would be interested in anything odd in the way of a *Colias*.

About a week later Mr. Lyman brought it back to me, remarking that "it was very curious that the colour of the under side should have become that greenish colour, by artificial light, and that *I had better spread it properly*." I thought I had done this already, but a slight breath closed its wings over its back and another flattened them out again. Three weeks more were given it on the setting-board, and it was still soft,

and now, 11 weeks after its capture, it remains, wings, antennæ and all, in as nice a condition for spreading as you could wish,—but it won't stay spread !

NOTE ON *BÆUS*.

BY W. HAGUE HARRINGTON, OTTAWA.

About ten years ago, in sifting swamp mosses for Coleoptera, I met with certain active little insects which, despite their wingless form and almost microscopic size, were recognized as members of the order Hymenoptera. Some of the individuals so captured were afterwards described by Ashmead, in his Monograph of North American Proctotrypidæ, as *Bæus minutus* and *B. piceus*. Subsequently, *B. americanus*, Howard, and *B. niger*, Ashmead, were also discovered at Ottawa. My solitary example of the former species was found sluggishly crawling on the under surface of a stone in the chilly temperature of early spring, and one example of *B. niger* was taken with a sweeping-net at the end of September. With these two exceptions, all my specimens of the genus were taken from moss collected at the beginning of winter. All were females, as might be expected, for it is the females only of bees and wasps, and probably of all hymenoptera hibernating in the imago condition, that survive the winter in these northern lands.

It was, therefore, with much pleasure that, in examining a tube in which a spider's cocoon had been placed, I found that a number of minute creatures had emerged, which required only a glance to show that they belonged to *Bæus*. The cocoon was a small spherical one, of mottled gray colour, about three millimeters in diameter, and was probably constructed by a member of the Theridiidæ. It was collected toward the end of June, but, unfortunately, the tube was laid aside unlabeled, and the time of emergence of the parasites is not known. Many of the spiders had also hatched, and had spun many delicate lines throughout the tube before perishing.

The parasites had apparently emerged later, as the majority of them had been entangled in the spiders' threads. They were twenty-four in number, and, to my delight, four were males, for individuals of which sex my searches had hitherto been in vain. Probably if they had not appeared with the females I should have had considerable difficulty in placing them.

The specimens are apparently referable to the *B. niger* of Ashmead, which is slightly larger than *B. minutus*, and more uniformly coloured. The females are a deep black, with the exception of the pale under surface of the antennal club, and of the tarsi, and, in some instances, of portions of the tibiæ, which are more or less piceous.

The males at first glance look larger, but this is due to the more developed thorax and to the presence of the wings. In the female the thorax is the smallest of the three sections of the body, and is almost lost sight of between the large head and abdomen. The head of the male is large, being slightly wider than the thorax, but the abdomen is minute and flattened, and the thorax robust and dorsally prominent. The antennæ and the legs, except the coxæ, are pale yellow, as in the solitary male of *B. americanus* mentioned by Ashmead. The scape of the antenna does not reach to the anterior ocellus, which is about on a line drawn across the face through the middle of the eyes; it is as long as four of the funicular joints. The pedicel is as long as the two following joints and stouter; the first joint of funicle is longer than second, but not so thick; the following seven joints are submoniliform; the penultimate is slightly longer than thick, and the final joint is small and conical. The two terminal joints are closely appressed, forming a small divided club.

The wings of these four males are much longer than in the individual figured by Ashmead (loc. cit., Plate VIII.), as they extend fully half their length beyond the tip of the abdomen. The marginal vein is situated about one-third of the length of the wing from the base and is as long as the stigmal nervure, while the basal nervure is well defined. Ashmead's figure shows the marginal vein beyond the centre of the wing, and indicates that the specimen figured was one not having fully-developed wings. Such differences in the development of the wings are not uncommon with the Proctotrypids. In the case of such insects as Bæus, of which the females are entirely wingless and have the thorax in part atrophied, it is interesting to find males with wings so well developed.

MR. PERCY B. GREGSON, of Waghorn, Alberta, President of the North-west (Canada) Entomological Society, is leaving at once for a visit to England, and does not expect to return till the beginning of March. He begs that his correspondents will abstain from writing to him during his absence, as he would be unable to reply to their communications.

THE COCCIDÆ OF BRITISH NORTH AMERICA.

BY GEO. B. KING, LAWRENCE, MASS.

(Continued from page 315.)

Eulecanium Fitchi, Sign. This seems to be a very serious pest. The specimens sent by Dr. Fletcher came from Mr. J. D. Evans, of Trenton, Ont., and the scales were infesting a plot of six acres of blackberry bushes, just as they were about ready for the market. Fortunately, however, of the first lot received, over one half of the scales were destroyed by a fungus, and of the second lot, about one third at least. Trenton is a new locality for this scale. In addition, the scale insects were infested to a remarkable extent by two species of *Hyperaspis* and two species of Chalcid parasites.

Eulecanium juglandis, Bouché. Very seriously infesting plum trees in Nova Scotia. Coll., Prof. Mackay. This is a new locality.

Eulecanium Canadense, Kll. This has been found on maple and elm at Arnstein, Ont., which is a new locality.

Aspidiotus perniciosus, Comst. I received this on twigs of gray willow growing at London, Ont. Coll., J. Dearness.

Aspidiotus ancylus, Putn. This was sent by Mr. Dearness, on plum and shell-bark hickory from East Essex Co., Ont.

Aspidiotus hederæ, Vall. Received from Mr. Dearness, who found it on English ivy on a house-plant set out of doors, at London, Ont.

Chionaspis Lintneri, Comst. Found on leather-wood (*Dirca palustris*) growing near the shore of Lake Huron, in mixed woods, about 40 miles from London, Ont., May, 1899. Coll., Mr. Dearness. The food-plant and locality are new.

Chionaspis pinifoliæ, Fitch. On exotic pine at Leamington, Ont., and on Austrian and Scotch pine at London, Ont. Coll., Mr. Dearness.

Chionaspis furfurus, Fitch. Two lots of this scale were received on bark of mountain ash from Ridgetown, Ont., and one lot on twigs of apple from London, Ont. Coll., Mr. Dearness.

NEW SPECIES.

Pulvinaria viburni, n. sp. (Native.) ♀.—Scale 4 mm. long, 3½ wide, to 5 long and 4 wide. Colour, red-brown. Ovisac, clear white. Texture, the same as in *P. innumerabilis*. Boiled in caustic potash the skin becomes colourless. Antennæ of 8 joints, measuring as follows in μ : Joint 1 (36), 2 (40), 3 (60), 4 (48), 5 (36), 6 (24), 7 (24), 8 (40). Formula 34(28)(15)(67). Leg: coxa 112; femur, with trochanters,

180; tibia 136; tarsus 80. Stigmatal spines in threes, one long and thin, two short and stout. Marginal spines numerous, simple, $24\ \mu$ long.

Hab.—On *Viburnum pubescens* in the woods at Aylmer, Prov. Quebec, about nine miles from Ottawa; on the same twigs were *Eulecanium corylifex*, Fitch. Coll., Dr. Fletcher. This species is allied to *P. innumerabilis*, *P. tilia* and *P. marmorata*, and I thought at first it was the last species, but it seems to be distinct.

Eulecanium Guignardi, n. sp. (Native.) ♀.—Scale coffee-brown, 5 mm. long, $3\frac{1}{2}$ broad, $2\frac{1}{2}$ high. The smaller, which were more numerous, 4 mm. long, $2\frac{1}{2}$ broad and 2 high. Dorsum quite convex. Texture of the scale thin, somewhat shiny. Cleared and mounted, well-boiled examples are colourless, while those not so are of a yellowish-brown. Skin minutely pitted. Antennæ 7-jointed. Measurements in μ : Joint 1 (48), 2 (44), 3 (60), 4 (64), 5 (28), 6 (24), 7 (52). Sometimes joints 3 and 4 are equal; 1 and 2 seem to be variable, often equal, and in this case they would measure $40\ \mu$ long, respectively; joint 7 is very constant at $52\ \mu$ long. Legs ordinary. Margin with two rows of spines, one short and stout, the other short, thin and sharp, 16 and $8\ \mu$, respectively. Spines of the lateral cleft in threes, nearly of equal lengths, although in some the centre one would be the longest.

Hab.—On plum trees at Niagara, Ont.; sent to me from the Division of Entomology of the Canadian Department of Agriculture, and named after J. A. Guignard, Asst. Entomologist, Experimental Farm, Ottawa. Newly-hatched larvæ translucent, with a slight tinge of pale green and with a distinct dark greenish-gray dorsal longitudinal band. In about six days the colour changes to a light yellow. Antennæ 6-jointed: Joint 1 (20), 2 (12), 3 (28), 4 (12), 5 (16), 6 (32). Front leg: coxa 24; femur and trochanter 52; tibia 40; tarsus $24\ \mu$ long. Anal tubercles long, each with one long bristle and one short spine. Marginal spines $12\ \mu$ long. Anal ring normal, with 6 bristles. The above described species has considerable resemblance to *Eulecanium vini* of Europe, but is described as new, after a careful study of various species and reference to all the literature at my disposal.

Lecanium pini, n. sp. (Native.) ♀.—Scale dark coffee-brown, 5 mm. long, 4 broad, 3 high. Antennæ rudimentary, although in some examples studied some showed a distinct three-jointed antenna, joint 2 longest, a little longer than 1, measuring in μ : Joint 1 (20), 2 (48), 3 (28). Length of the antenna $96\ \mu$. The third joint has a few short

hairs, about seven. Legs apparently wanting. Derm colourless, with the posterior half showing small round gland-pits. Posterior incision very long. Anal plates and around the anal area dark yellow. Newly-hatched larvæ dark ochreous, of the ordinary type, indistinctly 6-jointed, seemingly with only 5 distinct joints: Joint 1 (20), 2 (24), 3 (56), 4 (32), 5 (52). Front leg: coxa 44; femur and trochanter 80; tibia 56; tarsus 48 μ long. Anal tubercles with one long bristle and two short spines. Rostral loop large.

Hab.—On *Linus Austriaca*, London, Ont. Coll., Mr. John Dearness. Received since from Prof. E. P. Felt, State Entomologist of New York. Prof. Felt's scales were taken at Kierner, N. Y., and are seemingly rare, as he found only a few at this time. Mr. Dearness found his in quantities. In each case the scales were attached to the crowns of the leaves. As to the newly-hatched larvæ of *Lecanium* and *Eulecanium*, I wish to remark that in all the species yet studied by me, in the legs the tarsus is always shorter than the tibia. Mr. Maskell, Trans. N. Z. Inst., Vol. XXVIII., 1895, figures the larva of a typical *Lecanium*, and says of the legs that the tibiæ are shorter than the tarsi. He does not say of what species, however.

Eulecanium Lymani, n. sp. ♀.—Scale red-brown, distinctly pointed at each end, convex. Texture very thin, 3 and 4 mm. long, 2 $\frac{1}{2}$ broad, 1 $\frac{1}{2}$ high. Antennæ 6- and 7-jointed.

Measurements of joints in μ :

Joint —	1	2	3	4	5	6	7
	32	40	56	40	24	24	48
	40	40	52	52	24	20	44
	32	40	100	20	24	48	

Middle leg: coxa 60; femur and trochanter 140; tibia 100; tarsus 64 μ long. Marginal spines short, sharp, 20 μ long, easily lost in boiling. Derm yellowish; no pits observed.

Hab.—On a young oak at Quebec. The tree was 10 ft. high, growing by the roadside, adjoining a grove of trees, and quite a distance from any farm, house or garden. The upper part of the tree was very badly affected. Collected by Mr. Henry H. Lyman, after whom I have the pleasure of naming the species. Allied to such species as *Eulecanium Macdurarum*, Ckll. It seems to be very distinct and much different from any other *Eulecanium* found to infest oak trees. Just recently the Dominion Entomologist sent me the same thing on oak. Coll., Miss Lucy I. May, at North Hatley, Quebec.

Eulecanium rosæ, n. sp. (Native.) ♀.—Scale in many examples studied practically hemispherical, resembling in shape a small split-pea. Approximate size 4 mm. long, $3\frac{1}{2}$ broad, 3 high. The colour is variable in the adult stage, light red-brown to a yellow-brown, considerably wrinkled and pitted, with a dull glossy surface. Texture moderately thick. Cleared and viewed by transmitted light, the skin is brownish, showing many round gland-pits of two sizes. Antennæ 6- and 7-jointed, measuring in μ :

Joint—	1	2	3	4	5	6	7
	44	44	56	52	24	20	48
	40	44	96	24	24	44	

Joint one has 1 long hair; two 1 short; three has 2 long ones near the constricted end of the joint; four and five each have a short hair; six has 3 short, and seven has three whorls of hairs. Leg: coxa 80; femur 72; trochanter 128; tibia 112; tarsus 60; tarsal digitules 40 μ long; claw digitules 24 μ long. Width of coxa 52 μ , of the trochanter 40 μ .

Hab.—On rosebush at Sherbrooke, Quebec; found by Mrs. Brooks (Dr. Fletcher in litt.). *E. rosæ* differs very materially from the European *Lecanium* (*Eulecanium rosarum*) by the scale being nearly circular in outline, and having a 6- and 7-jointed antenna, while *E. rosarum* has a 7- and 8-jointed antenna.

(To be continued.)

CORRIGENDUM.—Page 315, instead of lines 4-6, read: "♀ Kahn-förmig, im Alten über halbkuglig, uneben, dunkelbraun. Die Eier ohne wollige Einhüllung. Länge 3 Linien. Am Weinstocke."

A NEW MEALY-BUG ON GRASS-ROOTS.

BY T. D. A. AND W. P. COCKERELL, EAST LAS VEGAS, N. M.

Dactylopius roseotinctus, n. sp.

Form and size about as in *D. Citri*; pink, distinctly segmented, with a slight covering of mealy powder; caudal tassels short but well-developed; lateral fringe of tassels very short, irregular, but plainly visible in fresh specimens. Females full of young show no signs of producing ovisacs.

Antennæ 8-jointed, joints measuring in μ : (1) 45-66, (2) 51-60, (3) 45-48, (4) 39-45, (5) 42-45, (6) 30-36, (7) 30-36, (8) 84-93. Middle leg: Femur and trochanter 240 μ , tibia 210, tarsus (without claw) 78.

Breadth of femur, 84 μ . Labium, length 135, breadth 90 μ . Caudal bristles and bristles of anal ring of the same length, 120 μ .

Boiled in caustic potash, the females turn bright red.

Hab.—Romeroville, New Mexico, on roots of grass, Nov. 9, 1901 (*W. P. Cockerell*).

Closely allied to *D. salinus*, Ckll. (from California), but the femora are stouter, the labium is broader, and the caudal bristles are much longer. The antennæ are curiously like those of the Brazilian *D. secretus*, Hempel. *D. roseotinctus* is also very similar to *D. trifolii* (Forbes), which has a lateral fringe, but there are various small differences, and the colour is not the same.

ENTOMOLOGICAL SOCIETY OF ONTARIO.

The thirty-eighth annual meeting of the Society was held in London on the 13th and 14th of November. The first morning was taken up with a business meeting of the Council. In the afternoon a conference on the San José scale in Ontario took place. Mr. Fisher, the Provincial Inspector, gave an interesting account of the present condition of the infested localities and of the work which had been undertaken for the repression of the insect during the past year. He also described very fully the remedies employed and the apparatus which had been found most useful. Dr. Fletcher gave some account of his observations in several parts of the country and in Ohio, and spoke in the highest terms of the good work done by Mr. Fisher and the wise measures adopted by the Department of Agriculture since the first outbreak of the pest. Prof. Webster (of Ohio) related his experience in dealing with the problem, which was the same in Ontario as in Ohio, and gave much useful information on the subject. The Hon. John Dryden, Minister of Agriculture for Ontario, in closing the discussion, spoke of the great difficulty he had to contend with owing to the refusal of the people in general to believe in the dangerous character of the scale. This Society, and the Fruit-growers' Association, should do their utmost to educate the public on this matter, and so lead them to co-operate in all measures that were adopted. He felt much encouraged by what he had heard that afternoon, and would continue to do his utmost for the extermination of the pest.

In the evening a public meeting was held at the Normal School and was very well attended. The Hon. John Dryden, who presided, spoke in very high terms of the Society and the good work it had done during a

long series of years. He considered it one of the most useful associations connected with his Department, and expressed the great pleasure it gave him to be present at its annual meeting.

The Rev. Dr. Fyles read his presidential address on "The Importance of Entomological Studies to the Community-at Large," illustrated with beautiful diagrams that he had himself prepared. Dr. Fletcher gave an address on "The Value of Nature Study in Education," and at the close exhibited a number of lantern pictures which showed the beauty and perfection of common objects in nature.

On Thursday, November 14th, the various reports of the directors, officers, branches and sections were read, and a large number of interesting and valuable papers. These will be published in full in the forthcoming Annual Report. The election of officers resulted as follows:

President—Rev. T. W. Fyles, D.C.L., F.L.S., South Quebec.

Vice-President—Professor William Lochhead, Ontario Agricultural College, Guelph.

Secretary—William E. Saunders, London.

Treasurer—J. H. Bowman, London.

Directors: Division No. 1—C. H. Young, Ottawa.

Division No. 2—J. D. Evans, Trenton.

Division No. 3—E. M. Walker, Toronto.

Division No. 4—G. E. Fisher, Freeman.

Division No. 5—J. A. Balkwill, London.

Directors Ex-officio (ex-Presidents of the Society)—Professor Wm. Saunders, LL.D., F.R.S.C., F.L.S., Director of the Experimental Farms, Ottawa; Rev. C. J. S. Bethune, M.A., D.C.L., F.R.S.C., London; James Fletcher, LL.D., F.R.S.C., F.L.S., Entomologist and Botanist, Experimental Farms, Ottawa; W. H. Harrington, F.R.S.C., Ottawa; John Dearness, Normal School, London; Henry H. Lyman, M.A., Montreal.

Director Ex-officio (Ontario Agricultural College)—Professor Wm. Lochhead, Guelph.

Librarian and Curator—J. Alston Moffat, London.

Auditors—J. A. Balkwill and W. H. Hamilton, London.

Editor of the Canadian Entomologist—Rev. Dr. Bethune, London.

Editing Committee—Dr. J. Fletcher, Ottawa; H. H. Lyman, Montreal; J. D. Evans, Trenton; W. H. Harrington, Ottawa; Prof. Lochhead, Guelph.

Delegate to the Royal Society—Rev. Dr. Bethune, London.

Delegates to the Western Fair—J. A. Balkwill and W. E. Saunders, London.

Committee on Field Days—The Chairmen of the Sections and Dr. Woolverton, Messrs. Balkwill, Bowman, Law, Moffat, Rennie, and Saunders, London.

Library and Rooms Committee—Messrs. Balkwill, Bethune, Bowman, Dearness, Moffat, and Saunders, London.

NOTE ON THE GENERIC TITLE BURTIA.

BY A. RADCLIFFE GROTE, HILDESHEIM, GERMANY.

The generic title *Burtia* was proposed by me in the first part of the Notes on the Zygaenidæ of Cuba, read February 12, 1866, before the Ent. Soc. Phil., and published in July of the same year. The genus is, however, incorrectly dated "1867" by Kirby in his catalogue of 1892, where *B. rubella* seems also wrongly given as a synonym of *Gundlachia cruenta*, H.-S., the two species being presumably distinct. Now, Moeschler had previously, in 1890 (Lep. Porto Rico, p. 349), given "*Horamia plumosa*, H.-S.," as a synonym of *B. rubella*, and "*G. cruenta*" as a synonym of *Callicarus pennipes*, thus according to my paper priority over Herrich-Schaeffer's in the Correspondenz Blatt, although these reversed references may chiefly show that Moeschler could not make out H.-S. descriptions, which are usually scanty. Kirby (p. 129) also gives *pennipes* the preference over *plumosa*, a name I cannot find in Hampson. From my copy, evidently not the original issue, I cannot find out the exact date for *Gundlachia*. Kirby dates *H. pretellus*, H.-S., as "Aug., 1866," a month later than *Gundlachia* or *Burtia*, though the former is, in my copy, on the previous page of Corr. Blatt. Under the circumstances that my paper was read in February, 1866, that Moeschler prefers *Burtia* in 1890, and that I figure it, I think my name should hold for the Cuban genus over *Gundlachia*, even if both appeared in the same month—July, 1866. Sir G. Hampson copies Kirby's wrong date of "1867" for *Burtia*, and, evidently misled by this, gives my name as a synonym, while separating the two species, *B. cruenta* and *B. rubella*, and figuring *rubella* on Plate XIII., Fig. 9, of his exhaustive work on the Syntomids. In the Philadelphia Check List the name *Burtia* is unnecessarily used for the Florida *Didasys belæ*, Grote, the two genera being distinct. I am not able to account for Kirby giving the date of "1867" for the genus *Callicarus*, Grote, 1866, a name he also misspells, and which is described in the same paper with *Burtia*. Probably the correct date for *Horamia plumosa*, H.-S., is August, while that of *Callicarus pennipes*, Grote, is certainly July, 1866.

SPECIES OF BRACHYCISTIS (FAM. MYRMOSIDÆ) FROM SOUTHERN CALIFORNIA.

BY T. D. A. COCKERELL, EAST LAS VEGAS, N. M.

Brachycistis gaudii, n. sp.—♂. Length about $6\frac{1}{2}$ mm.; shining black, brown on prothorax, at bases of wings, and at extreme (usually covered) bases of abdominal segments; antennæ long, dull reddish-brown, first joint of flagellum equal to second; head broader than thorax; eyes very prominent; ocelli in an equilateral triangle, the area between them elevated; edge of clypeus, and mandibles, dark ferruginous, the latter tridentate; mesothorax shining, hairs and punctures very sparse; metathorax minutely transversely lineolate; tegulæ light ferruginous; wings hyaline, iridescent, nervures pale except the costal, stigma large, dark brown; three submarginal cells and two recurrent nervures, the second recurrent sometimes failing below; marginal cell extremely short, broader than long, its greatest diameter about half length of stigma; first submarginal large, extending along stigma to marginal; second submarginal minute, triangular, entirely cut off from marginal; third submarginal minute, long and narrow, its tip reaching marginal; first recurrent nervure joining first transverso-cubital, second joining third submarginal cell near its base; abdomen shining, very sparsely punctured, with long sparse yellowish hairs; first segment swollen, about twice as long as broad, with a deep constriction between it and the second; apical curved spine long, ferruginous; legs black, knees, apices of tibiæ and tarsi light brown.

Hab.—La Jolla, San Diego Co., California, at light, Aug., 1901. 3 ♂. Allied to *B. elegantulus*, but different in colour, and the venation is not quite the same. Also related to *B. contiguus*, Fox, but the middle segment is not finely punctured posteriorly, and the venation differs.

Brachycistis carinatus, Fox, 1899.—San Pedro, Cal., July 9; La Jolla, Cal., August. Three males. The eyes are black, not pale castaneous as Fox describes; perhaps his specimen had been in alcohol. This insect comes to lights at night, and represents *B. glabrellus* on the coast of Southern California. It was hitherto known from one example, vaguely said to be from California.

We regret to record the death of Mr. P. C. Truman, of Volga, South Dakota, which occurred on the 27th of October, the result of an attack of pneumonia. He began collecting insects about seventeen years ago, and by diligent work succeeded in forming what is considered to be the finest collection of Lepidoptera in the North-western States, and also a good collection of Coleoptera.

Mailed December 10th, 1901.

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ERRATA.

Page 302, line 15, for *Fuchi* read *Fuchsi*.

Page 302, line 27, for "Mr. Charles Fuch" read "Mr. Charles Fuchs."

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The
Canadian Entomologist

VOLUME XXXIV.

No. 1.

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REV. C. J. S. BETHUNE,

LONDON, ONTARIO.

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1902.

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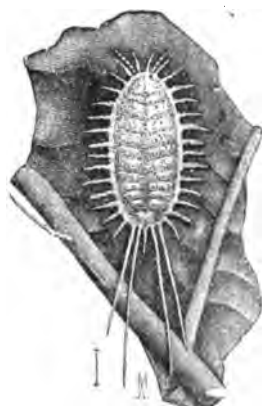
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VOLUME XXXIV.



Dactylopius longifilis, Comst.

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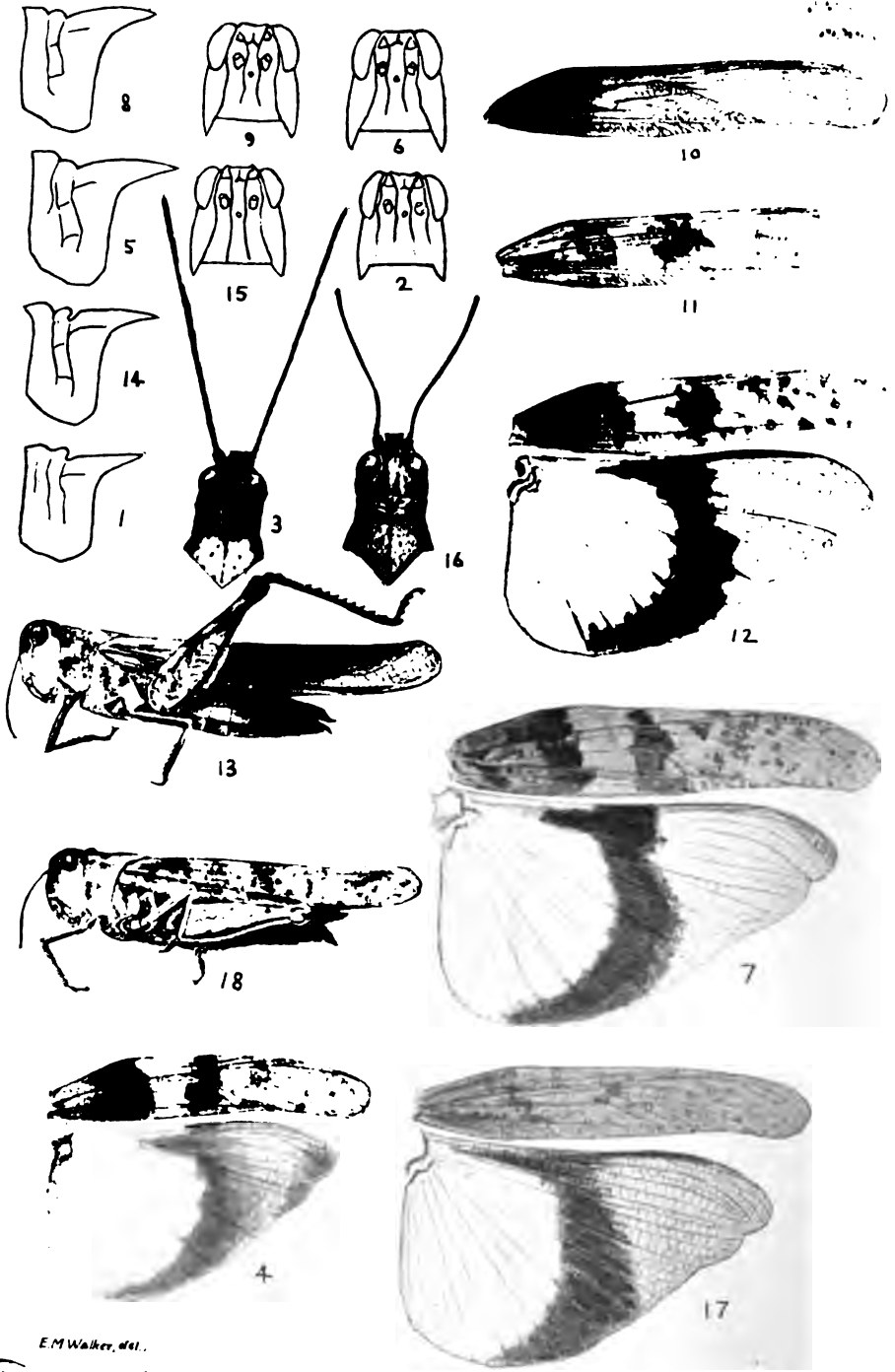
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E.M. Walker, del.

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LONDON, JANUARY, 1902.

No. 1

THE CANADIAN SPECIES OF TRIMEROTROPIS.

BY E. M. WALKER, B. A., TORONTO.

As only three specimens of *Trimerotropis*, Stal, have been reported from Canada, and as the writer has taken several others, of which three seem to be undescribed, the present paper may be of some value as a preliminary notice of the Canadian species of this genus.

The following table will serve to distinguish the species of *Trimerotropis* known to occur in Canada. It is artificial, but as the species enumerated are few, the table will perhaps be of greater service than would a more natural one. In the notes following the table the species are arranged according to McNeill's recent "Revision of the Orthopteran Genus *Trimerotropis*," the new species being placed according to their nearest affinities.

Key to the Canadian Species of Trimerotropis.

A¹ Hind tibiæ red, tegmina crossed by bands which may be conspicuous or faint on account of the slight contrast between them and the ground colour.

a¹ Disk of the metazone of the pronotum plainly lighter than the prozone. Bands of tegmina distinct, but formed by the segregation of numerous small spots.....3. *monticola*, Sauss.

a² Disk of the metazone not distinctly lighter than the prozone.

b¹ Bands of the tegmina conspicuous, solid, and not formed by a segregation of small spots; process of the metazone acute.....4. *Bruneri*, McNeill.

b² Bands of the tegmina inconspicuous, and made up of fuscous annuli; process of metazone obtuse.....5. *citrina*, Scudd.

A² Hind tibiæ never red.

a¹ Hind tibiæ blue. Bands of tegmina conspicuous, but made up of fuscous spots. Fuscous band of the wing very narrow2. ? *cæruleipes*, Scudd.

- a³ Hind tibiæ green or yellow. Bands of tegmina variable.
- b¹ Lower sulcus of hind femora light, with two dark bands.
- c¹ Tegmina long and narrow, the bands obsolete or represented by irregular groups of segregated spots. Hind tibiæ yellowish. Antennæ of male shorter than hind femora . . . 1. *maritima*, Harris.
- c² Tegmina of ordinary length and width, the bands conspicuous, the basal and median being solid. Hind tibiæ green. Antennæ of male longer than hind femora 6. *longicornis*, n. sp.
- b² Lower sulcus of hind femora black, with one preapical light band.
- c¹ Spur of the fuscous band of the wing extending about half-way to the base. Tegmina either with distinct bands, or when this is not the case, not sprinkled throughout with fuscous annuli.
- d¹ General colour light or dark brown, much varied with fuscous. Area of the cubital forks in ♀ occupied by several rows of cubical cells. Tegmina always crossed by well-defined bands. 7. *vinclata*, Scudd.
- d² General colour ash-gray, varied with brown and white. Area of the cubital forks in both sexes occupied, at least in the basal part, by a single row of cubical cells. Tegmina variable; bands usually poorly developed, often entirely absent, but sometimes well defined 8. *huroniana*, n. sp.
- c² Spur of the fuscous band of the wing extending very nearly to the base. Tegmina sprinkled with fuscous annuli, which show very little, if any, tendency to form bands. . . 8. *sordida*, n. sp.
1. *Trimerotropis maritima*, Harris.
Locusta maritima, Harris, Ins. Inj. to Veg., 1841, p. 178.
Oedipoda maritima, Scudd., Mat. Mon. N. A. Orth., 1862,
 p. 472.
Trimerotropis maritima, Stal, Recens. Orth., I., 1873, p. 135.

This species is found plentifully in Southern Ontario, along the shores of the great lakes, occurring in a form somewhat different from the typical one of the Atlantic Coast, and to which I have given the racial name, *interior* (CAN. ENT., XXX., 262).

McNeill's description of *maritima* in his recent Revision (p. 450) seems to have been based entirely upon specimens from the Atlantic Coast, and it does not fit *interior* in all respects. The width of the wing-band in the latter is often nearly one-fourth the length of the wing, whereas McNeill states that it is never as much as one-sixth; and the tegmina of *interior* often show distinct traces of three bands, which fact is also contrary to McNeill's description. Moreover, the measurements given are much too large for the race *interior*, although the latter is very variable in size. Accordingly, I give the following measurements taken from Ontario specimens:

Length of body, ♂ 19 to 22 mm., ♀ 26 to 30 mm.

Length of tegmen, ♂ 19 to 24 mm., ♀ 27 to 31 mm.

Length of hind femora, ♂ 11 to 12 mm., ♀ 13.5 to 15.5 mm.

I have specimens from the following localities: Toronto Id., July-Sept.; Rond Eau, Sept. 14, 1899; Point Pelee, Aug. 7, 1901; Kingsville, Aug. 13, 1897; Walpole Id., St. Clair River, Aug. 13, 1901; Southern extremity of Lake Huron, near Sarnia, Aug. 12 and 14, 1901.

2. *Trimerotropis ææruleipes*, Scudd.

Trimerotropis ææruleipes, Scudd., 2nd Rept. U. S. Ent. Com., App. 11, 1880, p. 27.

Mr. Scudder, to whom I sent a specimen of this insect for determination, replied that it was "apparently a new species near *ææruleipes*, or else that species, which is very variable," and remarked that he had a specimen like mine from Yellowstone Park. My specimens are from Discovery Id., near Victoria, B. C., Sept. 6, 1897; Nanaimo and Duncan's, Vancouver Id., Sept. 7, 1897. It is a very common insect on Vancouver Island, in both rocky and sandy districts. I found it in great numbers on Discovery Id., one of the numerous small islands near Victoria. Here it flew with a swift, low flight about the bare rocks in the more open places, the males producing a very rapid crepitation.

3. *Trimerotropis monticola*, Sauss.

Trimerotropis monticola, Sauss., Prodr. (Edip., 1884, p. 170.

This is the most abundant species of the genus on the dry plains of Assiniboia. It bears an extraordinarily close resemblance to one of the

commonest forms of *Spharagemon collaræ*, Scudd., which is met with in the same situations. It can be distinguished at once, however, by the two-notched median carina, the *Spharagemon* having but one.

I have specimens from Moose Jaw, Ass'a, Aug. 30, 1897; near Waldeck, Ass'a, Aug. 30, 1897; near Gull Lake, Ass'a, Aug. 30, 1897; Swift Current, Ass'a, Sept. 20, 1897; Morse, Ass'a, Sept. 20, 1897; Vernon, B. C., Sept. 10, 1897.

4. *Trimerotropis Bruneri*, McNeill.

Hadrotettix gracilis, Bruner, MSS.

Trimerotropis Bruneri, McNeill, Proc. U. S. Nat. Mus., XXIII, 1901, p. 423.

I have a single male of this species, taken at Swift Current, Ass'a, Sept. 20, 1897.

5. *Trimerotropis citrina*, Scudd.

Trimerotropis citrina, Scudd., Bull. U. S. Geol. Surv. Terr., II., 1876, p. 265.

I have seen no Canadian specimens of this form, but it has been reported by Scudder from Manitoba.

6. *Trimerotropis longicornis*, new species. (Pl. I., figs. 1-4.)

♂. Of medium size, dull grayish-brown, paler beneath. Head of average size, ash-gray below the ocellus, infuscated above. Face evenly but rather sparsely and indistinctly punctate throughout. Occiput considerably elevated above the pronotum, evenly convex, dark grayish-brown. Scutellum a little longer than broad, strongly sulcate, limited in front by a V-shaped depression. Median carina present, but faint. Lateral carina well marked, forming a very obtuse and somewhat rounded angle opposite the anterior margin of the eyes, from which they converge to meet the frontal costa. Lateral foveolæ triangular, rather large and shallow. Frontal costa failing by some distance to reach the clypeus, sulcate at and for a short distance below the ocellus, where it is slightly expanded; above the ocellus plane and evenly punctate. Lateral carinæ of the face reaching the clypeus, but not prominent. Eyes moderately prominent, about as long as the genal groove. Antennæ surpassing the hind femora by about one-fourth the length of the latter. Pronotum dark grayish-brown, rather short. Greatest width of disk about seven-eighths of the length. Prozone somewhat elevated and tectiform, three-fifths as long as the metazone. Disk of metazone much lighter than the

prozone, being pale grayish-brown, finely granulose with a few small scattered black tubercles ; process very slightly obtusangulate, the sides straight and the tip scarcely rounded. Median carina slightly cristate on the front part of the metazone, but gradually fading behind into a mere raised line, cristate and prominent on the prozone, and distinctly bilobate, the anterior lobe about twice as long as the posterior, the posterior notch much more prominent than the anterior. Lateral carinæ distinct only on the front part of the metazone. Tegmina of ordinary length and width. Area of cubital forks occupied by two or three rows of irregular cells. Markings of tegmina very like those of *T. vinculata* ; inner third occupied by a solid dark brown band, with a well-defined unbroken margin, beyond which are two others of the same colour, a solid median band about half as wide as the basal, and a still narrower, somewhat irregular and broken band between the outer and middle thirds of the tegmen. These bands are separated by light brown bands of about the same width as the median band. Apical third semi-transparent, with a few scattered dark brown spots. Wings with the disk light yellow, apical portion infuscated at tip, the hyaline area rather limited in extent, and not definitely separated from the rather narrow fuscous band which crosses the wing slightly beyond the middle and does not reach the anal angle. Spur extending half way to the base. Hind femora externally grayish-brown, with a pale yellow preapical annulus and crossed by two dark brown, not very well defined, bands ; internally the disk, inner, and upper sulci, are light yellow, crossed by two black bands. Hind tibiæ light green, with a pale yellowish sub-basal annulus.

Length of body, 21 mm. ; length of antennæ, 14.5 mm. ; length of head and pronotum, 7 mm. ; length of tegmen, 22 mm. ; length of hind femora, 11.5 mm.

Described from one male, Vernon, B.C., Sept. 10, 1897. I have another specimen, also a male, taken on the same date at the same locality, which I feel pretty sure belongs to this species, but differs so much in the character of the wing-band and in several less important points that I have hesitated to place them together. In this specimen the width of the fuscous band in its widest part is equal to fully one-fourth the length of the wing, it crosses the middle of the wing in the usual way, its outer margin is well defined, and the apical portion of the wing is hyaline, with only the slightest trace of infuscation at the apex. The antennæ are

somewhat shorter, but are still longer than the hind femora, the pronotum slightly longer, the greatest width of the disk being about four-fifths the length. All these points, with the exception of the character of the wing-band, might easily be due to individual variations, and in all other respects the specimens agree closely, so that the species is probably very variable in the markings of the wings.

T. longicornis seems to approach *T. salina*, Bruner, but I have not seen the latter species.

7. *Trimerotropis vinculata*, Scudd. (Pl. I., figs. 5-7.)

Trimerotropis vinculata, Scudd., Ent. Notes, V., 1875-76, p. 25.

Trimerotropis cincta, Sauss., Prodr. CEdip., 1884, p. 171.

I have specimens of this species from Agassiz, B. C., Sept. 9, 1897; Vernon, B. C., Sept. 10, 1897; Revelstoke, B. C., Sept. 19, 1897. I found it very common at Vernon in dry, open places, but at each of the other localities I took but a single specimen.

It has also been reported by Dr. Fletcher from Victoria, B. C. (Rep. Exp. Farms Can., 1888, 63).

8. *Trimerotropis huroniana*, new species. (Pl. I., figs. 8-13.)

Of medium or rather small size; pale ashy gray, varied with brown and white; in its general colour and maculation much resembling *T. maritima*, race *interior*.

Head of the ordinary size, pale ash-gray or nearly white, faintly mottled with darker gray. Occiput considerably (♂), very slightly (♀), elevated above the level of the pronotum, nearly smooth; brownish fuscous, with paler grayish mottlings, especially externally, where they form a pale postocular band continuous along the margin of the disk of the pronotum, with a more or less distinct band of the same colour. Below this pale band there is more or less indication of a grayish fuscous postocular band, more distinctly defined above than below, where it merges into the grayish mottlings of the genæ. Scutellum longer than broad (♂), about as long as broad (♀), strongly sulcate, limited in front by a V-shaped depression; median carina usually distinct, especially anteriorly, sometimes nearly obsolete. Lateral carinæ sharp, lighter in colour than the disk, extending and slightly diverging from a point opposite the middle of the eye to the front margin of the eye, where they form a marked angle, and whence they converge, keeping a fairly straight course, to meet the frontal costa. Lateral foveolæ rather small, triangular, moderately deep. Frontal

costa deeply sulcate throughout, considerably expanded at the ocellus, above and below which it is constricted, the sides below the lower constriction diverging as they approach the clypeus, which they fail to reach. Lateral carinæ of the face moderately prominent, reaching the clypeus, but less marked in the upper than in the lower portion. Eyes moderately prominent, as long as the genal groove (♂), distinctly shorter (♀). Antennæ about four-fifths (♂) or five-sevenths (♀) as long as the hind femora, grayish brown, slightly darker apically. Pronotum expanding moderately on the metazone, posterior margin rectangulate, the angle but little rounded. Greatest width of disk about four-fifths (♂) or five-sixths (♀) of the length. Prozone not more than half as long as the densely-punctate metazone; the latter gently convex antero-posteriorly and very broadly convex transversely. Median carina a raised line on the metazone, feebly cristate on the prozone, the anterior lobe nearly twice as long as the posterior, the notches, especially the anterior, rather shallow. Lateral carinæ distinct only on the anterior part of the metazone. Sides of the pronotum with two whitish spots, the upper extending across the whole of the prozone, the lower between the two posterior sulci. A dark brown spot separates these, and extends to the anterior margin of the prozone. Tegmina rather long, but of average width, quite like those of *T. vinculata* in form, extremely variable in markings, sometimes being as strongly banded as average specimens of *vinculata*, sometimes perfectly immaculate, with an ill-defined clouding of the basal fourth. Ground colour ashy or light brownish gray, in average specimens with distinct indications of bands, a basal one occupying the basal third or fourth, and a median band generally represented by an irregular but fairly solid spot. Apical third semitransparent, often immaculate, but generally with a variable number of scattered spots, which only in very distinctly marked specimens form any semblance of a band. Wings very similar to those of *vinculata*, slightly less than twice as long as broad. Disk very pale yellow. Fuscous band nearly equal, with both inner and outer margins arcuate; width about one-sixth, or a little more, the length of the wing; the spur extending about half way to the base. Apical portion of wing hyaline, immaculate; many of the veins whitish. Outer face of hind femora very light gray, with a pale yellowish preapical band, and with more or less distinct indications of a basal transverse fuscous band, and median and post-median oblique bands, these bands being generally well

marked in the ♂, but often indistinct in the ♀. Disk of the inner face black, with two light bands, a median and a preapical; the upper sulcus with an additional light band near the base; lower sulcus black, with one preapical light band. Hind tibiae pale yellow.

Length of body, ♂ 20 mm., ♀ 27 mm.

“ “ antenna, ♂ 10 mm., ♀ 9.5 mm.

“ “ head and pronotum, ♂ 7 mm., ♀ 8.5 mm.

“ “ tegmen, ♂ 22 mm., ♀ 27 mm.

“ “ hind femora, ♂ 11 mm., ♀ 13 mm.

Described from twenty-one ♂♂, fifteen ♀♀, Southampton, Ont. Aug. 20, 21 and 29, 1901.

This species is closely allied to *T. vinculata* and *T. saxatilis*, McNeill, but I am satisfied that it is distinct from both. Mr. Scudder, to whom I sent a pair, gave his opinion that they agreed slightly better with McNeill's description of *saxatilis* than with *vinculata*, but was unable to decide whether it should be referred to the former or not. I tried to obtain specimens of *saxatilis* for comparison, but was unsuccessful. Nevertheless, after comparing my series with McNeill's rather brief description of *saxatilis*, I find that there are points of difference that seem to be constant. These are as follows:

In *saxatilis* the metazone of the pronotum is not more than one and three-quarter times as long as the prozone; in *huroniana* it is in every specimen in my series fully twice as long as the prozone, and sometimes slightly more. In *saxatilis* the tegmina, though variable, are usually very strongly varied with fuscous, and when nearly plain it is by the suffusion of the ground colour with fuscous. In *huroniana* the tegmina are only occasionally strongly varied with fuscous, and when plain it is not through suffusion, but merely from absence of the bands; in other words, it is the darker specimens of *saxatilis* that have plain tegmina, whereas it is the lighter specimens of *huroniana*. The wings in *saxatilis* are relatively shorter than in *vinculata*, being considerably less than twice as long as broad. In *huroniana*, on the other hand, they are identical in form with those of *vinculata*, and the wing-band is as narrow as in that species, whereas it is broader in *saxatilis*.

It may also be mentioned that *saxatilis* in Arkansas is found only on rocky ground, whereas *huroniana* avoids rocks, being like *T. maritima*, partial to the sandy beaches, close to the water's edge.

From *vinculata*, besides differing in colour and markings, *huroniana* has a more deeply sulcate frontal costa, never being plane above the ocellus, and the area of the cubital forks of the wings is narrower, containing even in the ♀ but a single row of cubical cells in at least the basal portion.

This species is particularly interesting, as it seems to replace *T. maritima* on the northern part of the east shore of Lake Huron. In the vicinity of Southampton there is a limited extent of wide, sandy beach, north of which the shore is continuously rocky. On this beach *huroniana* is to be found under very similar but more boreal conditions to those under which *maritima* is found further south.

In flight it is extremely alert, and its stridulation is peculiar, being a very rapid but not loud crepitation, interrupted about thrice in a second, so that at a little distance it seems to be composed of separate notes. Usually three, sometimes four of these, are produced at a time.

9. *Trimerotropis sordida*, new species. (Pl. I., figs. 14-18.)

Of medium or rather small size, uniform dull pale grayish-brown, showing very little contrast in the markings of the body and tegmina. Head light brownish, more or less faintly mottled and punctate with a darker and more grayish colour. Occiput barely or not at all elevated above the pronotum, somewhat roughened, slightly darker than the face. Scutellum fully as broad as long, strongly sulcate; the median carina usually distinct for some distance backwards on the occiput, and limited in front by a slight V-shaped ridge, in front of which is a more or less marked depression. Lateral carinæ prominent and sharp, diverging to a point opposite the front margin of the eyes, where they form a marked angle, thence converging in a distinctly incurved course to meet the frontal costa. Lateral foveolæ large, subtriangular, moderately depressed. Frontal costa very strongly sulcate throughout, constricted above and below the ocellus; the sides below the lower constriction gently diverging until they meet the clypeus. Lateral carinæ of the face reaching the clypeus, strongly bent, very prominent and equally so throughout. Eyes moderately prominent, but not large, being even in the ♂ distinctly shorter than the genal groove. Antennæ about four-fifths (♂) or three-quarters (♀) as long as the hind femora, grayish-brown, darker apically. Pronotum of ordinary length, moderately expanded on the metazone. Process of metazone rectangulate or slightly acutangulate, sides straight, angle scarcely rounded. Greatest

width of disk four-fifths (δ), eight- or nine-tenths (η), the length. Prozone considerably contracted, with the disk rather more than ordinarily wrinkled, as long as or slightly shorter than half the length of the somewhat coarsely granulated metazone, the latter slightly convex both antero-posteriorly and transversely. Median carina prominent throughout, strongly cristate and bilobate on the prozone, the posterior notch especially deep and somewhat oblique; cristate on the anterior part of the metazone. Lateral carinae very sharp and prominent on the metazone, continued forward a short distance on the posterior part of the prozone. They are also present to a variable extent on the anterior part of the prozone. Tegmina rather long, of moderate width, pale dull brownish, sprinkled throughout with grayish fuscous annuli, which form a more or less distinct group occupying the basal third or fourth, and also show a tendency to collect in the middle of the tegmen, but do not form anything that could be called a band. Area of the cubital forks rather narrow, usually occupied by two or three rows of irregular cells, or, as in one δ which I have, by a single row of cubical cells. Wings fully three-fifths as wide as long; disk pale yellow; fuscous band crossing about the middle of the wing not reaching the anal angle, the outer margin less curved than the inner, so that the band is considerably wider where it meets the outer margin of the wing than it is at the costal margin. Greatest width of band varying from one-fourth to slightly more than one-third the length of the wing. Spur extending very nearly to the base. Apical portion of the wing hyaline, with a few fuscous spots near the apex in the δ , none of the veins whitish. Outer face of the hind femora plain grayish-brown, or with faint indications of darker bands; inner face black, with two light bands, a median and a preapical, the upper sulcus with an additional light band near the base; lower sulcus black, with one preapical light band. Hind tibiae pale yellowish, slightly darkened apically.

Length of body, δ 20 mm., η 23 to 28 mm.

“ “ antennae, δ 8.5 to 9 mm., η 9 mm.

“ “ head and pronotum, δ 7 to 7.2 mm., η 7.8 to 8.3 mm.

“ “ tegmen, δ 21.5 to 22 mm., η 24 to 26.5 mm.

“ “ hind femora, δ 10.2 to 11 mm., η 11.5 to 12.2 mm.

Described from 3 δ δ and 2 η η . Moose Jaw, Ass'a, Aug. 30, 1897, 1 δ , 1 η ; Waldeck, Ass'a, Aug. 30, 1897, 1 δ ; Morse, Ass'a, Sept. 20, 1897, 1 δ , 1 η .

This species is found on the semi-arid plains of Assiniboia. Its flight is higher and slower than that of any other *Trimerotropis* I am acquainted with, resembling that of *Circotettix*, as does also the stridulation to some extent, which, however, is no louder than that of most species of its genus.

In conclusion, I wish to express my sincere thanks to Mr. Scudder for his valuable assistance in determining the material upon which this paper is based.

EXPLANATION OF PLATE I.

Fig. 1,	<i>Trimerotropis longicornis</i> ,	♂, pronotum.
" 2,	"	♂, face, front view.
" 3,	"	♂, head and pronotum, from above.
" 4,	"	♂, tegmen and wing.
" 5,	<i>vinculata</i> ,	♂, pronotum.
" 6,	"	♂, face.
" 7,	"	♀, tegmen and wing.
" 8,	<i>huroniana</i> ,	♂, pronotum.
" 9,	"	♂, face.
" 10,	"	♀, tegmen.
" 11,	"	♀, tegmen.
" 12,	"	♀, tegmen and wing.
" 13,	"	♀, lateral view.
" 14,	<i>sordida</i> ,	♂, pronotum.
" 15,	"	♂, face.
" 16,	"	♂, head and pronotum.
" 17,	"	♂, tegmen and wing.
" 18,	"	♀, lateral view.

EULECANIUM LYMANI.

SIR,—Permit me to correct a slight error into which Mr. King has fallen in regard to the locality where I found the scales of *Eulecanium Lymani*, as the tree was not, as stated, at Quebec, but at St. Hilare, a station on the line of the Grand Trunk Railway, about twenty-two miles east of Montreal. I shall be happy to send specimens of this scale to anyone interested in scale insects.

H. H. LYMAN.

WEST COAST AND OTHER JASSIDÆ (HOMOPTERA).

BY E. D. BALL, COLO. STATE COLLEGE, FORT COLLINS, COLO.

Most of the material upon which the following descriptions are based belongs to the National Museum, and the species are here described at the request of the curator, Dr. W. H. Ashmead.

Eutettix pannosa, n. sp.—Resembling *saucia* and *scaber* in general appearance, smaller, darker, and with longer vertex and more generally reticulate elytra. Length, ♀ 4.5 mm., ♂ 4 mm.; width, ♀ 1.5 mm., ♂ 1.25 mm.

Vertex right angled, apex blunt, three-fifths as long as its basal width, two-thirds as long as the pronotum, half longer on middle than against eye, disc slightly sloping, flat, with the apex elevated. Face retreating, forming an acute angle with the vertex, front rather broad. Elytra rather short, compressed at the apex, venation weak, irregularly reticulate, the second cross nervure sometimes present.

Colour: vertex and pronotum pale cinereous or milky, heavily and very evenly irrorate with brownish fuscous, except that the anterior margin of the vertex presents six more or less definite dark spots, and the lateral margin of the pronotum is narrowly lined with ivory white. Elytra with the inner halves resembling the pronotum in colour, the outer half on either side milk white, with more or less of brownish reticulation, especially along the costal margin. The brown area on the disc being heaviest along the margin, and shading out towards the suture, the milk white area being continuous with that on the margin of the pronotum and including the claval suture to just before the middle, when it narrows down obliquely to one-half the former width, and becomes obscured by the heavier reticulation toward the tip. Face closely and evenly irrorate with fuscous.

Genitalia: female segment twice the length of the preceding posterior margin, rounding with a rather broad, blunt, slightly bilobed median projection, surface of the segment depressed either side of this tooth; male valve triangular, narrower than the ultimate segment, and about two-thirds its length; plates long, triangular, apices acute, three times the length of the valve.

Described from eight specimens from the National Museum collection, "Los Angeles Co., California, Coquillett collector."

Eutettix fenestrata, n. sp. Form of *pullata* nearly resembling *jucunda*, but more clearly marked. Longer and narrower than either

species. Pale, irregularly maculate with brown; elytra with numerous milk-white spots. Length, ♀, 6 mm.; width, 1.5 mm.

Vertex with the margins almost parallel, two and one-half times wider than long, scarcely half the length of the pronotum; the disc sloping, but slightly depressed, transversely angled with the front, the margin thick and slightly produced. Front longer and narrower than in *jucunda*, the margins nearly straight. Elytra long and narrow, folded at the apex; venation similar to that of *jucunda*, the nervures stronger, central anteapical cell very long, narrow and nearly parallel margined through the median half, where there are three or four rather strong cross reticulations, both ends enlarged, the anterior the larger and somewhat irregular in shape, the posterior sexangular; the claval nervures tied before the middle and the outer one with a cross nervure to the suture.

Colour: vertex pale creamy yellow, a pair of crescentiform spots at the apex, and a pair of dots inside the ocelli black, a narrow transverse band back of these and parallel with the margin, dark at the ends, shading to brown at the middle and spreading out as a wash on the disc. Back of this band are three brownish ovals, the outer ones connected with the margins of the eyes by dark brown dots. Pronotum pale cinereous, with numerous fine irrorations posteriorly, and a few large dark ones on the anterior half. Scutellum orange, washed with brown, four ivory white points and two brown dots on disc. Elytra brown, the nervures still darker, a large number of milky white hyaline spots arranged in transverse bands, one including the first cross nervures, and a broader irregular one across the anteapical cells; the sutural margins darker, with three pairs of equidistant round spots interspaced by the white tips of the claval nervures; the reflexed nervures along the costa broadened and darker brown.

Genitalia: female segment but little longer than the preceding, posterior margin truncate next to lateral angles, the middle half obtusely angularly produced, the apex of which is again produced into a short strap-shaped tooth, not as wide as the ovipositor, its width and length about equal.

Described from a single female from Prof. Cockerell, taken in the Sierra Madre Mts., Mexico, by C. H. T. Townsend.

Eutettix palliolata, n. sp.—Superficially resembling *Thamnotettix areola*, but much broader. Pale lemon yellow, with the pronotum,

scutellum and a narrow sutural stripe extending to the apex of the elytra of a rich testaceous brown. Length, ♀ 6 mm., ♂ 5 mm.; width, 2 mm.

Vertex longer and flatter than is typical for the genus, over half as long as its basal width, two-thirds the length of the pronotum, half longer on middle than against eye; front broad, nearly flat above, meeting the vertex in an acute angle, the margin narrow; pronotum very broad and almost parallel margined. Elytra rather broad, broadly rounding at the apex; venation obscure, somewhat irregular, a number of veinlets to the costa.

Colour: vertex pale lemon yellow, sometimes slightly greenish and sometimes washed with brown; pronotum and scutellum cinereous, washed with brown or pale brown, with traces of cinereous lines; elytra creamy yellow, the scutellar and sutural margins back to the apex narrowly striped with testaceous brown. These stripes are often narrowly margined with white anteriorly, including a narrow lateral margin of pronotum, and contain light spots as follows: a dot at the scutellar angle, a half circle in the margin before the middle of the clavus, a dark-margined spot in an enlargement of the stripe towards the apex of clavus, and a dot or margined spot in each of the first three apical cells. The brown stripes are very narrow at the apex of clavus and then enlarge as the elytra overlap. Face and all below pale creamy yellow.

Genitalia: female segment twice the length of the preceding, truncate posteriorly with the median fourth produced into a blunt tooth half as long as its basal width and slightly notched at the apex; male valve short, obtusely rounding, plates together spoon-shaped, their apices bluntly rounding and slightly upturned.

Described from eight specimens from the Nat. Museum collection labeled "Tex."

This is a strikingly distinct species, and while not a typical *Eutettix* in the shape of the head, it seems best to place it here for the present at least.

Scaphoideus scrupulosus, n. sp.—Similar to *blandus* and *jucundus* in form. The elytra more flaring and with the general appearance of an *Eutettix*, except for the sharp angled vertex. Pale, with a brown band on base of elytra, another on tip, and a triangular saddle on the disc. Length, 5 mm.; width, 1.25 mm.

Vertex flat, acutely angular, its length and width about equal, a little longer than pronotum, twice longer on middle than against eye; face as

in *jucundus*. Elytra moderately long, the venation obscure, and somewhat reticulate in the brown areas, resembling that of *blandus*; costal margin with a large number of nervures as in that species, but in this case they are less regular and slightly oblique.

Colour: vertex pale creamy, sometimes entirely washed with orange fulvous. In clearly marked specimens with a dash each side the apex, a faint line next the margin, and an irregular crescent on the anterior disc. Pronotum milky, with a submarginal row of obscurely infuscate spots anteriorly, and often a few irregular irrorations on the disc; elytra milky subhyaline, with a rather narrow basal band of pale brown, a triangular saddle occupying the posterior half of clavus, and extending out a little on to the corium, of a testaceous brown, often iridescent; the apex of the elytra, including all of the three inner apical cells, of a deep smoky or fuscous. The anterior white band is strictly transverse and parallel margined, and is very definite; only one or two of the principal veins show the brown markings across it. Back of this, however, there is more or less of brown reticulation, often enough to connect the dorsal saddle with the fuscous tip; costal veinlets fuscous; face lemon yellow, anterior and middle femora, except the apices, deep brown.

Genitalia: female segment nearly three times the length of the preceding, the lateral angles broadly rounding to the posterior margin, margin roundly excavate one-third the distance to the base; from this excavation a long strap-like tooth extends nearly half its length beyond the two rounding lobes of the segment. Male valve obtusely triangular, nearly as long as the parallel margined, ultimate segment; plates long triangular, two and one-half times the length of the valve, their apices slightly produced, and their margins clothed with long hairs.

Described from four females and a male from Los Angeles, Calif. Coquillett collector. Type—Cat. No. (?), U. S. N. M.

This is a strikingly distinct form in this genus, and in several respects suggests the *modesta* group of *Eutettix*.

Thamnotettix collaris, n. sp.—General appearance of *clitellaria*, the saddle longer and narrower, slightly larger and longer than that species, with a much longer and distinctly angled vertex. Length, ♀, 6 mm.; width, 1.75 mm.

Vertex bluntly conical, nearly twice as long on middle as against eye, half as long as its basal width; together with the eyes distinctly narrower

than the pronotum ; front narrow, the margins straight, elytra long and closely folded behind, venation indistinct.

Colour : vertex and face creamy yellow, a pair of approximate spots on the apex only partly visible from above, and a narrow basal line on the vertex black. Pronotum behind the eyes ivory white or slightly yellowish-white ; that part included between the eyes deep black, scutellum black, elytra black, an elongate saddle extending from the apex of scutellum to the apex of clavus, a yellow stripe along costal margin narrow at the base, gradually widening until it occupies half the corium, then abruptly terminating just before the apical cells ; face and all below yellow, the antennal sockets black.

Genitalia : female segment rather long, lateral angles slightly rounding, posterior margin triangularly emarginate, with a median strap-shaped tooth as in *clitellaria*, but shorter.

Described from a single specimen from New York City (H. C. Park).

Thamnotettix mendica, n. sp.—Form and general appearance of *belli*. Larger, and with a longer and more distinctly pointed vertex, with a pair of rather large approximate black spots at the apex. Length, ♀ 6 mm., ♂ 5 mm. ; width, 1.75 mm.

Vertex a little over half broader than long, two-thirds longer on middle than against eye, apex slightly conically pointed ; front narrow, the margins straight, sloping directly to the clypeus ; pronotum over half longer than vertex. Elytra long, inclined to be flaring, venation distinct, similar to that of *belli* and *geminata*.

Colour : vertex yellow, a pair of large triangular approximate black spots on the rounding margin of vertex and front ; face pale lemon yellow, the sutures fuscous, a few brown arcs on front not extending up to the black spots. Pronotum white or greenish-white back of the eyes, anterior margin between the eyes brown. Elytra brownish subhyaline, with a coppery reflection, the nervures greenish-white, the costal margin before the apical cells broadly subhyaline white.

Genitalia : female segment half longer than the penultimate, the lateral angles rounding, posterior margin triangularly excavated one-third the depth of the segment. From the bottom of this excavation arises a rather broad strap-shaped tooth, which exceeds the lateral angles ; male valve rounding, nearly semicircular, almost as long as the ultimate segment ; plates three times the length of the valve, convexly rounding at the base, then concavely narrowing to the acute apices.

Described from five specimens from Fort Collins, Colo., collected by Mr. Van Duzee and the author, and two males from the National Museum, one from Santa Clara Co., the other from Los Angeles Co., Calif., both collected by Coquillett.

The longer and more pointed vertex will at once separate this from any of the numerous varieties of *belli*, *montana* and *geminata*.

Thamnotettix bullata, n.sp.—Somewhat resembling *chiragrica*, smaller and with a narrower head, irregularly pale and fuscous, a pair of large black spots against the eyes in front; elytra with the nervures broadly light. Length, 5 mm.; width, 1.6 mm.

Vertex two and one-half times wider than long, half the length of the pronotum, but little longer on middle than against eyes, roundly confused with the inflated front, which is broadest across the antennal sockets and abruptly narrows to the clypeus. Elytra considerably longer than abdomen, almost parallel margined, apex obtusely rounding, appendix narrow; venation distinct, the nervures broad, the central anteapical cell extending beyond the other two, and slightly constricted in the middle half.

Colour: vertex pale orange, four dashes on the apex of vertex and front, anterior pair the larger, and a pair of large round spots occupying the entire space between the ocelli and the eyes, black. Pronotum cinereous or milky, more or less irregularly blotched with fuscous; scutellum pale yellow, with two large triangular spots within the basal angles. Elytra sprinkled with brownish fuscous, the nervures broadly white, emphasized on some of the cross nervures; face pale yellow, a few arcs on front brown; antennal sockets and narrow sutural line black; legs and below pale yellow, the ovipositor black.

Genitalia: female segment about half longer than the penultimate, the posterior margin slightly emarginate on either side of a broad median lobe that about equals the slightly acute lateral angles.

Described from three females from Los Angeles Co., Calif.; Coquillett collector. Received from the U. S. Nat. Museum.

This is another of the broad-headed species of *Thamnotettix*, which like *atridorsum* and *chiragrica* are not typical of the genus, and at the same time do not seem to be well placed in *Athysanus*:

Thamnotettix languida, n. sp.—Form of *Kennicotti* and *Coquilletti* nearly, but with a longer vertex and broader form. Darker than *Kennicotti*, with a pair of black spots just over the margin of the vertex and

another pair on the base, a submarginal row on pronotum and a basal row on scutellum. Length, ♀ 6 mm., ♂ 5 mm.; width, almost 2 mm.

Vertex one-half wider than long, half the length of the pronotum, the margins nearly parallel, the apex very slightly conically produced; face but slightly inclined, forming nearly a right angle with the flat, slightly sloping vertex; front broad below, abruptly narrowing to the clypeus; elytra rather broad, compressed behind, giving a wedge-shaped appearance to the insect; venation obscure, similar to that of *Kennicotti*.

Colour: vertex yellow, sometimes washed irregularly with brown, a pair of dashes on base of front visible from above, and a pair of round spots at base black. Pronotum varying from pale or milky to olive fuscous on the disc, the anterior fourth pale yellow, with an irregular band of black spots. Scutellum yellow, with a pair of round dots between a pair of larger triangles of black on the base. Elytra brown or brownish fuscous on the disc, shading out to subhyaline towards the margins posteriorly, the nervures lighter, the claval nervures milky, with the outer part becoming broadly so towards the apex; face pale yellow, a few brownish arcs on the upper part of front below the black dashes, and sometimes a line on clypeus.

Genitalia: female segment nearly twice as long as the preceding, but somewhat narrower, whole segment in the form of a parabolic curve, a second membrane appearing from under the lateral margins and extending back two-thirds the length of the segment; male valve very obtusely triangular, as wide but not over half as long as the apical segment; plates large, broader than the valve at base, and over four times as long, regularly narrowing from just beyond the base to the bluntly rounding apices; margins thick and clothed with weak hairs.

Described from eleven specimens from Los Angeles Co., Calif.; Coquillett collector. Received from the U. S. Nat. Museum.

This species seems to combine in part at least the characters of two different groups in *Thamnotettix*, for while in many ways it resembles *Kennicotti*, in other characters it is allied to some of the green species.

Errhomenellus irroratus, n. sp.—Smaller than *maculatus*, which it much resembles. Stouter bodied, and with a fuller front and more rounding head. Dark brown, irregularly dotted with pale yellow. Length, ♀, 6 mm.; width, 2 mm.

Vertex slightly less than a right angle, the apex blunt, almost twice broader than long, over twice longer on middle than against the small eyes; disc slightly convex, separated from the convex front by a sharp, slightly-curved carina; ocelli a little over their own width back of the carina, and about midway between apex and eye. Front broad, convex in both diameters, clypeus long, its depressed semicircular apex extending beyond the genæ. Pronotum transverse, about equalling length of the vertex, slightly emarginate on the median half posteriorly. Elytra brachypterous, but little longer than the pronotum, truncate or slightly rounding behind, coriaceous obscuring the venation.

Colour: dark reddish brown, vertex irregularly maculate with numerous small, round, yellow spots; pronotum and scutellum with numerous irregular yellow spots. Sometimes a pair of irregular yellow stripes ending on the outer angles of the scutellum. Elytra very sparsely maculate, an irregular blotch on the apical margins just within the costa; abdomen with numerous small spots and a pair of irregular longitudinal stripes yellow; face almost piceous with numerous fine yellow dots.

Genitalia: female segment large, nearly twice longer than penultimate, the posterior margin truncate within the triangularly produced lateral angles, a narrow median incision, back of which the segment is distinctly carinate.

Described from two females from Siskiyou Co., Calif.; collected by Koebele. Received from the U. S. Nat. Museum.

PAGARONIA, n. gen.

Allied to *Errhomenellus* and *Tettigonia*, but with a narrower head than in either. Resembling *Ciccus* in shape of head and pronotum. Head distinctly narrower than pronotum, the eyes small, vertex conical, nearly as long as the pronotum; the front reflexed over the margin as in *Tettigonia*; ocelli small, on the vertex just back of the suture that marks off the reflexed front, and one-third the distance from the eye to the apex. Pronotum short, emarginate behind, angularly inserted between the eyes, the lateral margin carinate, broadening posteriorly in a curve continuous with that of the anterior margin. Elytra longer than the abdomen, venation simple, usually but one anteapical cell—the outer. Face long and narrow, clypeus extending beyond the margin of the genæ; anterior tibiæ simple.

Pagaronia 13-punctata, n. sp.—Green, with thirteen small black spots on head and pronotum, and pale red lines on the elytra. Length, 8–9 mm. ; width, 2.25 mm.

Vertex acutely conical, one-fifth wider than long, five-sixths the length of the pronotum, disc flat, sloping slightly toward ocelli, slightly carinate behind, the carina angled near the eye on either side and extending back behind it; pronotum broadest across lateral angles, lateral margins as long as the eye, posterior margin rounding from lateral angles to the scutellum, then emarginate. Elytra longer than the body and rather broad; venation simple, the apical cells twice longer than broad; front much inflated transversely, but slightly narrowing to clypeus.

Colour: pale green, vertex with seven black spots as follows: a pair on the basal suture, a pair just outside and behind the ocelli, a spot on either side the apex and one just before the middle of the disc. Face green, a black spot just under the conical apex of vertex and a pair of smaller ones, often obscure, on the suture just below the ocelli. Pronotum green with three black spots in a row across the disc, the outer pair on a line behind the eyes, the median one behind the middle of the pronotum. Elytra greenish subhyaline, sometimes with pale reddish lines between the nervures.

Genitalia: female segment as long as the penultimate, the posterior margin very slightly produced, elevated in the middle, almost carinate, often giving the appearance of a slight notch; male valve usually entirely concealed, plates long and finger-like, three times as long as their combined basal width, over twice the length of the apical segment, narrowing toward the apex and sparsely clothed with weak spines.

Described from nine specimens from Los Angeles Co., Calif. (collected by Koebele and Coquillett); three from Pasadena, Calif. (H. C. Fall), and three from Marin Co., Calif. (C. Fuchs).

Pagaronia 13-punctata, var. *triunata*, n. var.—Size and structure of the species: Colour dirty straw yellow, sometimes washed with reddish; vertex with all seven spots of the preceding species enlarged and somewhat irregular, the posterior pair on the disc near the margin instead of being in the suture, an elongate dash on the reflexed portion of front on either side, about midway between the apical spots and the pair

against the ocelli. Front with twelve pairs of distinct fuscous arcs which emit a broad definitely-margined stripe of yellow bearing a black spot above. Pronotum with a submarginal row of irregular spots, heaviest near the margin. Elytra sometimes of a unicolorous dirty straw, sometimes pale yellow, with the spaces between the nervures scarlet, except along the costa.

Described from four specimens from Santa Clara Co., Calif. (Coquillett), and three from Santa Cruz Co., Calif. (Koebele).

This is a very puzzling form and seems in several characters to connect the *Tettigonidæ* with the *Jassidæ* through some of the lower forms in that group.

Paropulopa interrupta, n. sp.—Form of *M. scanicus* nearly, slightly smaller, vertex flat and not extending behind the eyes; colour very variable, usually pale straw with interrupted fuscous markings on pronotum and elytral nervures. Length, 2.5–3 mm.; width, 1.25 mm.

Vertex flat or slightly depressed on the disc, deeply, coarsely pitted, a little over twice as long on middle as next eye, two and one-half to three times wider than long, the anterior margin rounding or bluntly angulate, face retreating, forming a very acute angle with vertex. Front flat, slightly depressed above, broadest across the antennal pits, from which ridges extend nearly to the apex, forming shallow pits between these and the vertex margin in which the ocelli are located. Whole face deeply pitted, ocelli slightly nearer each other than the eyes, clypeus rounding at the apex and extending some distance beyond the genæ. Pronotum with the entire posterior margin nearly straight, anterior and lateral margins in a broad curve. Elytra coriaceous, apex bluntly angular, nervures raised, distinct, cells somewhat irregular, often a few extra nervures along costa, a cross nervure between the sectors before the anteapical cells and often two behind this opposite the anteapical cells.

Colour: very variable, often pale straw, with more or less of fuscous markings on pronotum and with the nervures and margins of elytra interruptedly fuscous, sometimes these marks are arranged in the form of oblique bands. Sometimes the whole insect is of a rather uniform brownish fuscous and sometimes of a tawny reddish shade, the punctures on pronotum are usually dark marked.

Genitalia: female segment shorter than the penultimate, the posterior margin triangularly emarginate from the lateral angles clear to

the base in the middle, so that all that is visible of this segment is a triangular strip on either side from under the margin of which another more broadly triangular strip is exposed; male, ultimate segment very large, valve transverse, one-half as wide and one-third as long, the posterior margin truncate, plates as wide as the valve and nearly four times as long, apparently united for more than half their length, the apices broad and individually rounding.

Described from nine specimens from Los Angeles Co., Calif. (Coquillett and Koebele), and four specimens from Pasadena, Calif. (H. C. Fall).

This, and the following species, introduce a new subfamily into the American fauna. It remains only to discover a *Ledra* and a *Ulopa* and we shall have all the European groups represented.

Paropulopa Mexicana, n. sp.—Resembling *interrupta*, but larger. Front distinctly convex, elytra long and narrow. Pale testaceous brown with fuscous pitting. Length, 3.5 mm.; width, 1.25 mm.

Vertex slightly longer and more angular than in the preceding form, fuller and less sharply angled with the vertex. Front full and distinctly convex, a slight depression under the apex of vertex, the carinae under the ocelli very faint. Pronotum shorter and broader than in *interrupta*, the posterior margin straight. Elytra long, regularly tapering from both margins, coriaceous, the claval suture often indistinct; the venation similar to *interrupta*, but weak and irregular posteriorly, no cross nervure between the sectors before the anteapical cells.

Colour: testaceous brown, with more or less of fuscous on vertex and pronotum, chiefly in the coarse pits.

Genitalia: female segment two and one-half times the length of the penultimate, the lateral margins parallel to the middle, then suddenly narrowed one-fourth the width of the segment and again parallel; posterior margin truncate or roundly emarginate, with an open median notch.

Described from two females from the Sierra Madre Mts., Chihuahua, Mex. Alt. about 7,500 ft. Collected by C. H. T. Townsend, and sent by T. D. A. Cockerell.

NOTES ON THE LARVÆ OF *ARCTIA VIRGO*, LINN.

BY ARTHUR GIBSON, DIVISION OF ENTOMOLOGY, CENTRAL EXPERIMENTAL FARM, OTTAWA.

In Dr. Dyar's "Preliminary Notes on the Larvæ of the Genus *Arctia*" (Jour. N. Y. Ent. Soc., March, 1900), some interesting remarks are made in reference to the larvæ of *Arctia virgo*, as to the stage in which the larvæ hibernate, and if they ever possess a dorsal stripe.

Through the kindness of the late Mr. T. G. Priddey, of Toronto, we received on the 10th April, 1901, three larvæ of *A. virgo*, collected by him on the 5th April. Writing under date of the 8th April to Dr. Fletcher, Mr. Priddey says: "I shall probably get more larvæ, but even now the bank under the grass where they hibernate is quite solid ice." The three specimens only moulted once before maturity, viz., on the 26th April, 30th April, and 8th May, respectively; so these, at any rate, hibernated in the penultimate stage. Mr. Dwight Brainerd tells me that "at Montreal, *A. virgo* generally hibernates in its second to last skin; that is, it sheds its skin twice in the spring before going into pupation." He also states that he has found specimens in the fall in the penultimate stage. In the Annual Report of the Entomological Society of Ontario for 1896, on page 13, Dr. Fyles mentions that in the spring of 1891 he collected larvæ of this species at South Quebec, which moulted on the 4th May and again on the 20th May, the moths emerging on the 10th July.

With regard to the dorsal stripe, the following description of the full-grown larva, with the appended notes, will show that all the three specimens received from Mr. Priddey possessed this character:

Length, just after last moult (30th April, 1901), 35 mm. Beautiful deep black larva, with bunches of stout black bristles from tubercles on dorsum, and reddish bristles from tubercles on lower portion of sides and on venter, and a striking dorsal stripe of bright yellow distinct on all segments but 2 and 13. Head 3.6 mm. wide, shiny black, with lobes full, slightly furrowed at vertex, sparsely covered with short and long black hairs; mouth-parts and ocelli black; antennæ reddish-brown. Whole skin of body deep velvety black. Tubercles conspicuous, bearing bunches of distinctly barbed bristles. The bristles from tubercle iv and from all tubercles above spiracles are deep black. On most segments the majority of the bristles from tubercle v are bright rust-red, those from the upper portion of tubercle only being black. The

bristles from all tubercles below v are bright rust-red. Tubercle i about one-half the size of ii; ii has a shining base. Tubercles i, ii and iii are black, iv behind and almost touching the spiracle very slightly reddish, v and vi distinctly reddish, vii and viii on venter black. Spiracles yellowish-white. The thoracic feet are shiny black outside, lighter inside, tipped with pale brown and bear black and light-brownish bristles. The prolegs are brownish-red, and bear many rust-red bristles. On segment 2 there are several long thin hairs, not barbed, which slope forward and hang down in front of the head. On segments 11, 12 and 13 are also some long hairs, which are faintly barbed.

Two days after moulting the spiracles had changed to a bright orange. Five days after moulting the dorsal stripe was less conspicuous, being quite bright on and near middle of each segment, but faint (whitish) near division of segments. Eleven days after moulting the dorsal stripe was creamy white, expanded somewhat in the middle of each segment.

Length of mature larva 55 mm., extended 60 mm.; width at widest part, 8.5 mm.

Two other specimens of the mature larva differed somewhat from the one from which the above description was drawn. This difference was chiefly in the colour of the tubercles. In one of the specimens, tubercles iv, v and vi were partly whitish, vii and viii being black as above. In the other specimen, tubercle iii on abdominal segments, dorsal tubercles on segments 3 and 4 and tubercles vii and viii were all reddish. In this latter specimen tubercle ii, which was black, changed to reddish on all segments but 11, 12 and 13. The dorsal stripe was distinct in both of these specimens, in the one case the colour being a dirty whitish, and in the other a beautiful orange-yellow, distinct on all segments. On segment 2 in this latter specimen the bristles from the front half of the dorsal tubercles were bright rust-red, the same as those from tubercles below spiracles, as well as nearly all the bristles from lower half of tubercle iv, and the median suture of head was white.

Mr. R. J. Crew, of Toronto, who has bred *A. virgo*, tells me that about half of all the larvæ he reared had the dorsal stripe. Mr. Brainerd has also found the dorsal stripe to be common, and states that "a larva of *A. virgo* with red spiracles in one skin will often have them jet black in the next."

On the morning of the 16th May one larva began to make its cocoon, which was very slight, being simply some leaves drawn together and fastened by a few threads of silk. By the morning of the 22nd May the larva had changed to pupa. Another began to spin on the 22nd May.

and by the 29th had changed to pupa. The third specimen was inflated. The first moth emerged on the 15th June, and the second on the 20th June. At Ottawa the moths have been taken during the second week of July, and at Toronto the writer has collected specimens at the electric lights about the same time.

Pupa.—Length, 29 mm.; width at widest part, 10.75 mm.; black, yellowish-brown in folds of abdomen, pruinose, as if the pupa had been heavily frosted—whole surface roughened. Abdomen and thorax sparsely covered with short black bristles. Spiracles black, shiny, conspicuous. Cremaster rough, shiny at base, hollowed below, bristles capitate, reddish brown. The pupa when first formed is reddish-yellow on dorsum of thorax; wing-cases dull yellow. The ground colour of the abdomen is reddish, the segments are ringed with black, and in folds of segments there is much white.

DR. HERMAN STRECKER.

Dr. Herman Strecker, a widely-known sculptor, and one of the leading entomologists of America, died on the morning of Nov. 30, at his home in Reading, Pa.

He was stricken with apoplexy on the evening of the 29th of November, and passed away without regaining consciousness. He was in the 65th year of his age.

Dr. Strecker was of German descent, and was born in Philadelphia, March 24, 1836. He inherited his fondness for scientific studies, and evinced this inclination at an early age. On his mother's side were three naturalists of note. They were Benjamin, Edward and Richard Kern.

He was an architect, designer and sculptor by profession. He located in Reading when a boy, having accompanied his father, who was a prominent dealer and worker in marble, at that time. Since then he followed the pursuit of his father. As a sculptor he gained a wide and enviable reputation. He produced many praiseworthy works of art.

He began his work as an artist and sculptor in his 12th year, and laboured hard ever since. All his literary and scientific work, the immense correspondence attending the making of his collection, was done at night, his vocation as a sculptor taking up his daylight hours.

He travelled a great deal, and in 1855-56 visited many islands in the West Indies. He also travelled in Mexico and Central America, to examine the old Aztec monuments, as well as to add to his collection.

Dr. Strecker was one of the most eminent authorities on the Lepidoptera in America. He was well versed in some of the dead languages, and a master of many living foreign tongues, in which works of his special pursuit are written. He owned the largest, most remarkable and in every way the most valuable collection on the American continent. It is said that there are but few in the world that surpass it. The Strecker collection contains over 200,000 specimens, gathered from every portion of the globe.

In consideration of his scientific work and knowledge, the degree of Ph. D. was conferred upon him by Franklin and Marshall College.

In his earlier days Dr. Strecker made frequent trips to Philadelphia, studying at the Phila. Acad. of Nat. Sciences all branches of natural history, but later devoted all his time to entomology, and finally to macrolepidoptera.

He published numerous works on Lepidoptera, for which he drew and coloured the plates himself. His principal work, long out of print, was "Native and Exotic Butterflies and Moths."

He published the work under difficult circumstances ; he was a poor man at the time. He saved sufficient money to buy a lithographic stone, and then drew the group of butterflies on the first page of the work. This was sent to Philadelphia, printed and then returned. When the stone came back he repolished it and drew upon it another group. In this way the stone travelled to and from Philadelphia, until all the plates were published. All the copies were sold. The demand increased, but no more were ever issued.

The collection is contained in many glass-covered drawers, and each specimen is labelled as to locality, etc. The collection cost many thousands of dollars. An attempt to describe the collection would be useless, but many extremely rare and valuable flies are contained therein. Upwards of 300 types and an equal number of co-types are in the collection. It is one of the most remarkable collections in the world in regard to aberrant and dimorphic forms.

Dr. Strecker was constantly visited by men of science from all parts of the world.

In his social relations he was cordial and affable, a genial friend and a good neighbour. He was reserved and unassuming in speaking of his own achievements. In his chosen field he ranked deservedly high.

The scientific world loses one whom it can ill spare. He left a widow, son and daughter.

LEVI W. MENGEL, Reading, Pa.

SYNONYMIC NOTES.

BY HENRY H. LYMAN, M. A., MONTREAL.

In 1834 Dejean proposed the name *Euchætes* for a genus of Coleoptera, and it had thus been preoccupied for seven years when Harris used it in 1841 for the moth named by Drury, *Bombyx Egle*.

In 1858 it was used for a third time by Scater for a genus of birds, and in 1876 Leconte described another genus of Coleoptera under this same much-used name.

As it is a well-known rule of nomenclature that a generic name can be used only once in the animal kingdom, all subsequent use of the term for other genera is erroneous and must cease.

It therefore becomes necessary to give other names, and I propose the name *EUCHÆTIAS*, from a kindred Greek word, for the genus erected by Harris. It is not necessary for me to define the genus, as it is well known, and this is merely a necessary change of name, the type, of course, being *Egle*, Drury.

For the genus erected by Leconte, I would suggest the name *EPEUCHÆTES*, the type being *Echidna*, Lec.

Leconte's genus was described very fully in Proc. Amer. Phil. Soc., XV., 319, and the type species on page 320.

In view of what I said in my first presidential address on the subject of changes in generic names, it is perhaps the irony of fate that it should fall to my lot to myself make changes of this nature, but I can at least plead in extenuation, as the woman in the story did of her baby, that they are only very little ones.

Recently, in working over my Notodontidæ I made a rather curious discovery, namely, that the true *Angulosa*, S. & A., is the species which stands in our catalogues as *Georgica*, H.-S. On plate 83, which, by the way, in the English page of the text is erroneously numbered LXXVIII., are shown two moths, a ♂ and ♀, the former of which can only represent *Georgica*, while the latter is doubtless intended for the species which we have been calling *Angulosa*, as its larva feeds on oak, though it really, in my copy at least, looks more like *Ferruginea*, Pack., the larva of which, however, feeds on birch. But this ♀ is figured merely as a colour variety of *Angulosa*, as in the text it is said "the female in the figure is a variety of colour, most of that sex being coloured like the male."

It therefore necessarily follows that the male of the plate, and its proper female, which is described, but not figured, is the true *Angulosa*, S. & A., of which *Georgica*, H.-S., is a synonym, and that what we have called *Angulosa* has never been properly described and named, but as these moths have been so long known under these names, it is probably best to allow them to stand as they are, as no injustice is thereby done, and the female of the species now known as *Angulosa* was figured by Smith and Abbot, though erroneously, under that name.

THE SCIENTIFIC NAME OF THE CHERRY FRUIT-FLY.

BY M. V. SLINGERLAND, CORNELL UNIVERSITY, ITHACA, N. Y.

In September, 1899, I published an account of a new cherry pest, which I called the cherry fruit-fly (Bulletin 172, Cornell Experiment Station). As stated on pp. 31 and 32 of this bulletin, the identity of the adult insect had not then been established, although the evidence strongly indicated that it was the fly known as *Rhagoletis cingulata*, Loew. I kept my breeding cages containing the hibernating puparia of the insect in the warm greenhouse or insectary all winter, and on March 9th, 1900, the first cherry fruit-fly emerged. It did not disappoint my expectations, for it demonstrated beyond further doubt that this new cherry-fruit pest is *Rhagoletis cingulata*, Loew. By May 31st nine more of the flies had emerged, and then cherries near the insectary were nearly half grown. The flies continued to emerge until July 11th in my cages, and on June 30th I received word from Geneva that they were abundant about the trees where the fruit was ripening. This correspondent caught quite a number of the flies with sticky fly-paper hung on a shingle in a tree; he said they seemed to be attracted to any bright-coloured thing like a new straw hat.

Since the Bulletin was written, I have received evidence to indicate that the pest had been destructive during the preceding three to five years at Bonaparte, Iowa; Westboro, Mass.; State College, Pa.; Batavia, Syracuse, Portland, and Cataraugus, N. Y. Correspondents at Westboro, Mass., and Clifton Springs, N. Y., think that the same insect worked in their cherries at least thirty-five years ago.

Considerable damage was done by the insect in New York in 1900, but we heard little of it in 1901.

Mailed January 10th, 1902.

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The
Canadian Entomologist

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No. 2.

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EDITED BY .

REV. C. J. S. BETHUNE,

LONDON, ONTARIO.

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1902.

PAY FEES FOR 1902 AND SECURE ANNUAL REPORT. EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

OFFER named European hymenoptera in exchange for N. Am. hymenoptera. Refer to Prof. Grote. J. D. ALFKEN, 18 Delmestr., Bremen, Germany.

LEPIDOPTERA.—*Papilio palamedes*, *Calephalis borealis* and many others to exchange. Would like to receive lists. JOHN & HURD COMSTOCK, 1572 Ridge Ave., Evanston, Illinois.

LEPIDOPTERA.—Pupæ and imagoes of nearly all N. Am. Sphingidæ and imagoes of Arctians desired in exchange. HENRY ENGEL, P. O. Box 369, Pittsburg, Pa., U. S. A.

WANTED.—Erycinidæ of the world. Also butterflies from the Western and North-western States. Offer Diurnes from Central and South America, in faultless condition. LEVI W. MENGEL, Boys' High School, Reading, Pa.

DIPTERA.—Wanted, as many Asilina as possible from all parts of North America. Write for particulars to PROF. C. H. FERNALD, Amherst, Mass.

WANTED.—Ants and Termites. Specimens and literature for exchanges. H. WOLFF, S. J., Canisius College Museum, Buffalo, N. Y.

WANTED.—Nos. 3 and 6 of Vol. 8 of the Entomological News. FRANK E. WATSON, 974 E. 168th St., New York, N. Y., U. S. A.

LEPIDOPTERA.—Fine bred specimens of *Catocala illecta* and *minuta* for exchange. Also *Nathalis iole*, *Anera andria*, etc. Want *Catocala*, butterflies and sphinges. G. M. DODGE, Louisiana, Mo.

WANTED.—American silk-producing Lepidoptera. Directions for the rearing of wild silkworms can be obtained from the author. For terms, address ALFRED WAILLY, Branksome, Upper King's Road, Kingston Hill, London, Eng.

FOR EXCHANGE.—Butterflies of this neighbourhood, for those not in my collection. Have also a number of chrysalids of *Femisea tarquinius* for exchange. Address: WILMON NEWELL, Wooster, Ohio.

ORTHOPTERA.—Wanted, specimens and literature for exchange. FRANK E. LUTZ, Zoological Bldg., University of Chicago, Chicago, Ill.

A NEARLY complete set of U. S. Agricultural Reports for exchange for some works on Entomology not in my library. Please make offer. GEORGE B. KING, Lawrence, Mass.

ACULEATE HYMENOPTERA, especially Apogidea, wanted. Will give good exchange in Coleoptera or Hymenoptera. E. S. G. TITUS, Urbana, Ill.

WANTED.—Cicindelidæ, Carabidæ, and rare Scarabæidæ. Will give good exchange in Exotic and rare European Coleoptera (named), also Odonata and Hymenoptera from N. America. Send list to R. J. WEITH, Elkhart, Indiana.

DIPTERA wanted from Washington and British Columbia in exchange for North American Coleoptera. W. S. HUNTINGTON, 1910 N. Twenty-first St., Philadelphia.

PAPILIOS brevicauda, nitra, Oregonia, indra, female, nezahualcoyott wanted; also Cicindelidæ, Cychrus, Carabus and Calosoma. Will give liberally in exchange. GEO. A. EHRLMAN, 2314 Sarah Street, Pittsburg, Penna.

LEPIDOPTERA.—I have a large number of both mounted and papered specimens for exchange. All are 1900 captures. Correspondence in both English and German. Address: A. KWIAT, 701 Larrabee St., Chicago, Illinois, U.S.A.

LEPIDOPTERA, in papers, of Canada and U. S. A., wanted in good exchange for fine Lepidoptera of Europe, Asia, South America. I take only first-class quality. Please to write Smith's number upon the paper. WILHELM NEUBURGER, Lepidopterist, Berlin, S. 42, Luisen-Ufer 45, Germany.

COLEOPTERA.—Will exchange Canadian Coleoptera, in papers, for Coleoptera of U. S. and Canada. Please send lists. C. J. OUELLET, Deaf and Dumb Inst., Ville St. Louis, Montreal, P. Q.

The Canadian Entomologist.

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No. 2

THREE NEW NOCTUIDS FROM BRITISH NORTH AMERICA.

BY JOHN B. SMITH, SC. D., RUTGERS COLLEGE, NEW BRUNSWICK, N. J.

To the courtesy of some of my correspondents from British North America I owe a series of specimens, some of which proved undescribed. The species sent by Dr. Fletcher is of some economic importance, and its prompt description seems desirable. The other species have been in MSS. for some time, and were intended to form part of a lengthy descriptive paper. Their publication together at this time gives this contribution a somewhat faunal character.

Semioophora Youngii, n. sp.—Ground colour varies from carneous gray to smoky brown, variably powdered with black or suffused by darker shadings. Front of head and tips of palpi always gray; sides of palpi blackish brown. Male antennæ with lengthy, slender, yellowish pectinations. Collar inferiorly rusty red or brown, surmounted by a blackish or darker line or band, and more or less obviously gray tipped. Discal tufting gray or at least paler than ground; patagiæ a little gray speckled. Primaries with all the usual maculation well defined. Basal half line black, single, twice dentate, followed by a gray shade line. Between this line and base is a gray powdering, always obvious and sometimes prominent; beyond it on the sub-costal is another less prominent shading, which extends to the t. a. line. T. a. line geminate, more or less broken, upright or a little outcurved, outcurved in the interspaces, though not prominently so. Outer line black, inner line obscure, scarcely defined, intermediate space gray. In one example the gray included space only is visible. T. p. line geminate, evenly outcurved over the cell, inwardly oblique, or with only a slight incurve to the inner margin. Inner line black or blackish, lunulate, outer line smoky, even; included space gray,

cut with black on the veins. S. t. line irregular yellowish or gray, punctiform or continuous, preceded by a darker brown to black shading, the terminal space usually paler. A series of brown or blackish interspaceal terminal lunules. Orbicular rather large, oval, somewhat oblique, concolorous or a little paler, rather prominently ringed in yellowish or gray. Reniform moderate in size, kidney shaped, gray or yellowish ringed, more or less pale powdered, and sometimes completely yellowish. No claviform. Secondaries rather even smoky brown, with a reddish tinge in the male, especially defined on the fringes. Beneath rosy gray to reddish; primaries with disk smoky, secondaries paler basally and powdery. A common extra discal line. Primaries with the s. t. line marked; secondaries with a discal spot. The male is more coppery red than the female.

Expands 1.30-1.50 inches = 32-37 mm.

Habitat.—Mer Bleue, near Ottawa, Ontario, Canada; Mr. C. H. Young.

Two males and five females, and each different from every other. One male is almost uniformly carneous gray, the lines are not prominent, the reniform contrasting yellowish. One female is evenly blackish brown, the median lines reduced to the pale included spaces, and the ordinary spots narrowly pale ringed. A third form has all the maculation sharply defined as described, and the terminal space is decidedly paler than the rest of the wing. Between these three types the variation ranges. The cell may be also darker, even blackish, or may be entirely concolorous with the remainder of the wing. One specimen recalls *Platagrotis condita*, another resembles *Adelphagrotis stellaris*.

The specimens were sent me by Dr. Fletcher, who tells me that he knows the early stages, and that Mr. Young has bred some of the examples submitted to me. It will be his pleasure to add to the history of this unusually variable and interesting species. The dates on the specimens before me range from August 19 to September 7.

Carneades infusa, n. sp.—Ground colour smoky brown, varying a little to a violaceous shading. Head and collar a little paler, the latter with a slender obscure black transverse line. Thorax concolorous, posterior tuft tending to become a little discoloured. Primaries with costa a little paler, tending to yellowish at the base, not discoloured or strongly contrasting. The median lines are practically wanting. A curved black mark at base below median vein does not quite reach the place of the t. a. line. T. a. line marked by a black spot in the cell, by a cross-line closing

the claviform, and by a series of more or less evident black scales below that point. Claviform narrow, not quite reaching the middle of median space, black ringed, the lines almost touching. T. p. line marked over the cell by a slight difference in tint between median and s. t. space, below that lost or barely traceable. S. t. line barely traceable. Orbicular irregular, black ringed, paler centered. Reniform large, broad, only a little constricted, hardly kidney shaped, black ringed, pale centered; both spots appearing slightly discoloured. The cell before, between and beyond the spots is blackish. Secondaries whitish, with a smoky outer border. Beneath powdery, the primaries gray, secondaries whitish, no obvious maculation.

Expands 30-31 mm. = 1.20-1.24 inches.

Habitat.—Cartwright, Manitoba; Black Hills, Wyoming.

Two indifferent males only are before me at present; but I have had other and better specimens of both sexes. The species is really *obeliscoides* without the contrasting costa and with the t. p. line lost so that there is an almost even shade below the cell from t. a. line to outer margin; the terminal space being scarcely deeper. The ground colour and general variation in tint are as in *obeliscoides*, but the species is perceptibly smaller. It is type 4368 U. S. N. M.

Hyppa Brunneicrista, n. sp.—General form and maculation of *xylinoides*, but darker throughout, more blackish gray in tinge. A rich deep brown shade extends longitudinally through the centre of the primaries toward the apex. Secondaries smoky blackish, somewhat paler basally, but with no trace of yellow as in the common species. The sides of the thorax are solid dark chestnut brown, while in *xylinoides* there is a light brown centre with a black border. Posterior thoracic tuft rusty brown. Abdomen blackish, without trace of yellowish tinge. In the s. t. space of the primaries there is a rusty brown shade from inner margin, prominent opposite anal angle, and gradually merging into the ground. Beneath uniformly darker and more powdery than in the known species.

Expands 40-42 mm. = 1.60-1.68 inches.

Habitat.—Calgary, Alberta, Head of Pine Creek, June 19, 22, July 2; F. H. Wolley Dod.

One male and two females are now before me, and Mr. Dod has as many more. He wrote under date March 9, 1901: "Evidently a distinct species, entirely overlooked until a week ago when I was rearranging and relabelling my entire collection. I had looked on it as a mere seasonal

dark form, but now find I took both forms in the same seasons. * * * *
The ♂ antennæ are obviously different, and this has a rusty patch on basal tuft of thorax, and differs also in the anal angle of the primaries and colour of secondaries. These differences are *quite constant* in my series." The antennal difference referred to by Mr. Dod is in the greater length of the pectinations in this new species, and this is accompanied by an even greater difference in the male genitalia. Though fully as large as *xylinoides*, this new species has the male harpes actually smaller, while the clasper and other processes are quite unlike.

HYDROECIA AMERICANA SPEYER, OR HYDROECIA ATLANTICA SMITH.

To whom should a species be credited: to the author who names it a variety and declares positively that it is not distinct from another, which he considers the stem, or to the author who first points out the specific characters and establishes its distinctness?

In 1875 Dr. A. Speyer, in his paper on "Europäisch-amerikanische Verwandtschaften," gives first, a list of American species which he considers distinct from European forms, a list of species occurring in both countries, a list of questionable forms, and then elaborates these lists by a series of notes. In the list of species common to both countries, he enumerates *Hydroecia nictitans*, and afterwards points out some minor differences in the series before him, noting that Guenée had previously enumerated most of them. On page 152 of the volume he speaks as follows: "Als eigene Art wird sich die amerikanische Nictitans von der europäischen nicht trennen lassen, da ein völlig durchgreifender Unterschied zwischen beiden fehlt. Eine ausgezeichnete Varietät bildet sie aber jedenfalls."

And then he characterizes his variety as follows:

"Var. b. Americana. Al. ant. lætius latericiis s. fulvis, apice subfalcato. Patr. Amer. Septentr."

We have, then, very clearly established what Speyer thought of the American form. First, he ranges it as identical with the European; next he declares that there is no constant difference between the examples from both countries, hence specific separation is impossible, and, finally, he bases a varietal name on a slight difference in general colour and

outline of the fore wings. He marks it "Var. b.," evidently considering *erythrostigma* as "Var. a.," though it is not so quoted.

Did Speyer describe a new species by this process? He specifically declares that he does not, and states positively that the characters noted by him are not constant. In the latter point he is correct, for, based on his description, the name has absolutely no standing.

Of this opinion was Mr. Grote, for in his list of 1882 he cites *nictitans*, Bkh., with two varieties—*erythrostigma*, Haw., and *lucens*, Tr. Speyer's *Americana* is not cited at all, hence it was evidently considered a synonym, for Mr. Grote certainly knew of Speyer's paper.

In 1899, after a thorough study of the species of *Hydroecia*, I pointed out a positive structural difference between the *nictitans* of Europe and the form that had received that name here. I was the first to claim specific standing for the American form, and the first to point out its characters. Why am I not entitled to the species? To call it by Speyer's name would credit him with something he never did, and would give him a species he never recognized, based upon the work done by me twenty-four years later.

The rule of priority is a great thing, but a little justice in its application is not entirely undesirable.

I am aware that this position is not entirely in accord with Canon XXVII. of the A. O. U. Code, but it is nevertheless a fact that my name *atlantica* is the first ever applied to the American species resembling the European *nictitans*.

JOHN B. SMITH.

A FEW NOTES ON THE LEPIDOPTERA OF 1901 IN SOUTHERN MANITOBA.

BY E. FIRMSTONE HEATH, CARTWRIGHT, MAN.

It is very curious and interesting to observe the waves of insect life that annually pass over this district. For instance, some four years ago the genus *Acronycta* was strongly represented in some ten or twelve species. The following season that genus almost disappeared, and its place was taken by the old genus *Agrotis*, with its now numerous subdivisions. Last year the various species of the genus *Carneades* were certainly in the ascendant, and occasionally there comes a year like this, when perhaps only an odd species or two show up in any quantity, as was the case more particularly with *Carneades pitychrous*, and while most of

the great genera were almost entirely absent, one's labours were rewarded by the capture of a few specimens of species comparatively rare hereabouts.

The butterflies started with a great show of "Painted Ladies," *Pyrameis cardui* (I do not think its name has been changed lately), apparently hibernated specimens. Where they came from is somewhat of a mystery, as I do not recollect noticing many during the previous year. Owing to a succession of cold and frosty nights during May and the early part of June, insect life received a check, and very few butterflies were visible, even of what are our commonest species. The *Theclas* and *Pamphilas*, usually abundant, were absent in nearly all species, and the show of "Blues" was very meagre. *Pieris rapa* was rather more numerous than usual, and the finding of an occasional larva in a dish of cabbage made one for the moment almost fancy oneself once more in England. This butterfly is certainly increasing in numbers, and before long may become troublesome here. The only butterfly that was at all numerous in September was *Grapta progne*, and I did not see one of the other species of the genus that are usually equally abundant.

Among the Noctuids, my first capture of any importance was a nice series of all the varieties of *Homoglaea hircina*, both at light and at sugar. This moth has in past seasons been rather a rarity with me, and, with the exception of a single *Taniocampa subterminata*, was the only early species taken.

On May 12th I took a single specimen of *Biston ursarius*, a moth I have not seen for many years. On May 14th I netted a dozen or so of moths—and could have taken many more—flying, in the dusk, about some wild plum trees that were then in bloom, and much to my disgust I found them to be nothing but worn, hibernated *Peridroma saucia*. Where did they come from? *P. saucia* was not in unusual numbers the year before, and I have very seldom taken any at this early date in previous years. Currant bloom (the wild black) did not yield anything like its normal harvest. *Cucullia intermedia* was very scarce. *Mamestra Farnhami* was not so numerous as usual, but, besides *Plusia simplex*, which is always to the front, I took some half dozen of *Plusia precatationis*, a very scarce moth here, and one that I have only before taken in single specimens, at light, in August. So long as the plums, cherries and *Amelanchier Canadense* remained in bloom, sugar had no charms, and my sugared trees remained unproductive till quite late in the season, the only

captures I made being at light, on the few damp, warm evenings that were vouchsafed me.

The Sphingidæ appeared in their usual species and quantity. June 20th was rather a red-letter night in my diary, as I took at light a very fine Cossus, which seems different to any in my collection. I believe this to be a rather notable catch; at all events, it is so to me. The few specimens I have were reared from larvæ found frozen in firewood during the winter, but I find them very difficult to feed to maturity. From the number of larvæ there seen, I should expect the moth to be far more in evidence, but it seems to be of a very retiring disposition, and conceals its beauties from vulgar gaze. Although Noctuids were very scarce, some specimens of Geometers and "Micros" generally were more than ordinarily abundant. I must have added some fifteen or twenty species, which are as yet undetermined, to my collection.

In August, sugar proved more attractive, though nothing very special turned up. In a note to Mr. Hanham's list of our Manitoban moths, recently published in the CANADIAN ENTOMOLOGIST, Dr. J. B. Smith says that from material furnished by myself he thought that *Carneades incallida* and *C. quinquelinea* must be taken as one species. I thought so too at the time, but further observation of a long series of living specimens induces me to think that a separation can be made into two groups. One, which I take to be *C. incallida*, has rather broader primaries of a dull, nearly white, colour, with the lines pale and indistinct. The other group, *Carneades quinquelinea*, has the primaries slightly narrower and of a more glossy, bluish-white colour, with the lines strongly marked. Besides these groups there is a residuum of old worn specimens of which it is very difficult to say to which species they belong.

Many of our usual autumn Geometers were absent, but I was pleased to take two or three *Hybernia tiliaria*, a moth I have not seen for many years.

A few species of Hydræcia came to light, among them being single specimens of *nelita*, Strecker, and *frigida*, Smith, and also *cataphracta*, which last is new to the Manitoban list.

The autumn Plusias were altogether wanting.

That curious moth, so singular in its habits, *Ufeus plicatus*, has been more than commonly numerous. I have only taken a single specimen outside the house at light, but inside, from October to the beginning of

December, according as the weather was mild or otherwise, I have taken from six to a dozen annually.

No particular case of insect damage came under my notice. The grasshoppers have not reached us, and our soil is too heavy for them to flourish thereon. Our very severe winters and late frosts in May and June seem to keep all insect life in due bounds, but the latter are also detrimental to our crops.

THE UNITED STATES NATIONAL MUSEUM.

The following census of the Lepidoptera in the U. S. National Museum was made in December, 1901 :

	No. of specimens.	No. of species.	No. of inflated larvæ.	No. of types.
Butterflies.....	15,606	2,408	290	29
Sphingidæ.....	1,214	251	109	0
Saturnians.....	882	168	170	1
Arctians and allies.....	4,756	863	402	48
Noctuidæ.....	16,807	2,367	545	509
Lasiocampidæ, Notodontidæ, etc.	3,390	505	687	17
Geometridæ.....	8,727	1,233	449	103
Sesiidæ, Limacodidæ, etc.	2,582	471	172	29
Pyrilidæ and Pterophoridæ	9,216	1,366	111	47
Tortricidæ.....	4,940	724	77	33
Tineidæ (sens. lat.)	12,146	1,797	56	179
Material not yet placed in the regular collection.....	19,266	(est.) 500	421	251
Alcoholic larvæ.....(est.)	5,000
Pupæ, cocoons, etc.(est.)	3,000
Duplicates.....	18,560	208
	126,092	12,653	3,697	1,246
Add inflated larvæ as above....	3,697			

Total number of specimens. ... 129,789

Comparison with other American collections is invited.

HARRISON G. DYAR.

COLORADO BOMBIDÆ.

BY E. S. G. TITUS, URBANA, ILL.

During 1900-01 I made some studies on the Bombidæ occurring in Colorado. This paper is an abstract of those studies, the main body of which is in an unpublished thesis deposited with the Secretary of the State Board of Agriculture at Ft. Collins, Colorado. The material used is in the collection at the State Agricultural College of Colorado, and in my own collection; also a few specimens at the U. S. Nat. Mus. Most of the collection passed through the hands of Mr. Wm. H. Ashmead, who corrected determinations and who very kindly looked over the table given below, not only making corrections in it, but adding some species I had not recognized.

It will, of course, be understood that *colour characters* referred to in the table *always* mean *colour of pubescence*.

TABLE OF SPECIES.

I.—Abdomen without orange-red band.

Dorsum of thorax generally entirely yellow.

A. Apex of abdomen black.

First segment yellow, rest black *Virginicus*.

First segment yellow, next three fulvous *dorsalis*.

First two segments yellow, rest black *vagus*.

First two and basal middle of third segment yellow,
rest black *Morrisonii*, ♀.

First three segments bright lemon-yellow, rest glossy
black *perplexus*, ♂.

First three and middle of fourth segment yellow, rest
black *Morrisonii*, ♂.

AA. Apex of abdomen fulvous.

First three segments yellow, rest, except apex,
black var. *Hudsonicus*, ♂.

Dorsum of thorax more or less black on the disk.

A. Apex of abdomen black.

First segment yellow, basal middle of second yellow or tawny, rest
black *separatus*.

First three segments yellow, rest black *Nevadensis*, ♀.

AA. Apex of abdomen black and fulvous.

First three segments yellow *Nevadensis*, ♂.

Dorsum of thorax banded with black.

A. Thorax before the band white *appositus*.

AA. Thorax before the band yellow, scutellum yellow.

B. Apex of abdomen black.

First segment and second (except basal middle)

yellow *affinis*.

First, second partly, and fourth segments yellow, rest black *Edwardsii*.

First and second segments yellow *scutellaris*, ♀.

First four segments yellow *fervidus*, ♀.

First four segments lemon-yellow *sonorus*, ♀.

First, second, fourth and fifth (partly) yellow.

Venter nearly bare *Putnamii*, ♀.

Venter and legs with long yellowish hairs .. *Putnamii*, ♂.

BB. Apex white.

First two segments black, third fulvous, fourth to sixth segments white *Coloradensis*, ♀, var. nov.

First two and fourth segments black *proximus*.

First, second partly, and fourth segments black .. *Howardii*.

BBB. Abdomen, except apex, ochreous or yellow.

Apex tufted with black, wings uniformly

fuscous *fervidus*, ♂.

Apex fulvous or fulvous-yellow, wings subhyaline basally, broadly fuscous at apical third *Pennsylvanicus*, ♂.

AAA. Thorax before the band yellow, scutellum more or less black.

First segment black, vertex with two yellow patches. *terricola*, ♀.

First segment partly yellow, vertex all black. *Pennsylvanicus*, ♀.

"All the dorsal segments clothed with a fulvous pubescence" *Titusi*, n. sp., Ashmead.

II.—Abdomen with a more or less distinct orange-red band.

Dorsum of thorax more or less distinctly banded with black.

A. Apex of abdomen black or nearly so.

B. First and fourth segments, second at least partly, and third segment entirely, orange-red.

C. Scutellum all yellow.

Second segment all orange-red, face yellow *ternarius*.

- Second segment orange-red, face pale, black hairs above antennæ.....*sylicola*.
 Second segment with basal middle yellow.....*rufocinctus*.
 CC. Scutellum and second segment partly black, remainder of second segment orange-red.....*bifarius*.
 BB. First two segments yellow, third and fourth orange-red.
 Scutellum all yellow.....*justus*.
 Scutellum partly black, thorax anteriorly mixed with black.....*flavifrons*.
 AA. Apex of abdomen not entirely black.
 Apex of abdomen orange-red, first two segments yellow, third black.....*Oregonensis*, ♀.
 Apex of abdomen not so bright, some yellow mixed with fulvous colour.....*Couperii*.

Dorsum of thorax with mixed pubescence.

First two segments pale, third black, apex orange-red.....*mixtus*.

All localities in the following list are in Colorado, except where otherwise stated.

B. dorsalis, Cress., 1878.

Mr. Ashmead, in looking over my table, has written in "First segment yellow, 2, 3 and 4 fulvous.....*dorsalis*, ♀." I have not seen the specimens the note was upon.

B. separatus, Cress., 1863.

♀ June, ♂ July 20, August 8 (C. Stannard) at Ft. Collins: ♂ Henderson, August 30 (Gillette).

B. Morrisonii, Cress., 1878.

♀ May 10, June 8, 9, September 15; ♂ July 20, 24; ♂ September 22, at Ft. Collins. 2 ♀ July 13, Trinidad; August 5, Antonito (Gillette). ♂ August 21, Cerro Summit; August 19, Horsetooth Gulch. ♂ August 22, Cimmaron. Taken on *Cleome serrulata*, *Mentzelia multiflora*, *Helianthus annuus*, *Thermopsis montanum*, *Alnus viridis* and "wild rose."

This very distinct species is one of the largest and finest Colorado Bombidæ; and is found not uncommonly in Colorado and New Mexico.

B. perplexus, Cress., 1863.

One ♂ September 22, Ft. Collins, which I doubtfully refer to this species. The pubescence is beautifully bright, and the black hairs are

very glossy. The second joint of the maxillary palpi is very long, the relation of first to second being as 2 to 19.

B. perplexus, var. *Hudsonicus*, Cress., 1863.

Prof. Cockerell records this variety from Cusack Rch, Custer Co., Colo., August 3. The type locality is "Hudson Bay Terr.," not "Hudson" as given by Dalla Torr .

B. Nevadensis, Cress., 1874.

B. improbus, Cress., 1878, ♂.

♀ ♀ June, July 12, 24, August 6, 18, at Ft. Collins; ♀ ♂ July 31, August 1, Beaver Creek; July 3, Little Beaver Creek; May 23, Boulder; May 26, Bellvue; August 5, Antonito (Ball); ♀ July 24, Virginia Dale; ♂ July 8, Livermore.

There is now little question that *B. improbus* is the male of this species. The type of the male was taken in "Colorado" by Morrison; of the female the types were from Nevada, Arizona and New Mexico.

B. fervidus, Fabr., 1798.

"*Apathus elatus*" ♂, in part.

♀ May 12, 30, June 7, 8, 11, 16, 19; ♀ May 14, 20, 25, June 15, July 20, 31, August 8, 19, 20; ♂ September 3, 16, all at Ft. Collins. ♀ ♀ August 14, July 8; ♀ July 15, at Livermore; ♀ August 5, Antonito; July 13, Trinidad; August 17, Montros  (Gillette); July, Ft. Lupton (R. Haynes). 2 ♂ September 4, Boulder. A very common species.

B. borealis, Kby., 1837.

This species was recorded by Prof. Cockerell from Old Beddoe's Rch, Custer Co., August 9, on *Rudbeckia laciniata*. I have not been able to satisfactorily separate this species from any material I have seen.

B. appositus, Cress., 1878.

♀ August, Ft. Collins (C. Stannard); August 5, Cameron Pass; August 9, Gunnison; August 23, Leadville; September 23, Vir. Dale; June 15, Bellvue; July 15, Livermore. ♀ ♀ August 30, Store Prairie (7,000 ft.). ♂ Palmer Lake, August 12, 1896 (Gillette). This species can readily be recognized by the white pubescence of the anterior part of the thorax; visible even in specimens on the wing. It has been taken on *Thermopsis montanum* and *Rudbeckia*, sp.

B. dubius, Cress., 1863.

This is recorded by Prof. Cockerell from Custer Co.; a female in the collection at Ft. Collins, doubtfully labelled *B. Edwardsii*, may belong here. I took the specimen at Westlake (8,000 ft.), July 7, 1900.

B. scutellaris, Cress., 1863.

♂ July 22, August 25, Ft. Collins; August 4, Julesburg (Ball). The pubescence is bright and showy, while on *B. Edwardsii*, its nearest relation, it is more irregular and paler.

B. Edwardsii, Cress., 1878.

♀ (2) June 12, Ft. Collins; June 15, Bellvue; Rist Canon, July 1; Westlake, July 7; August 3, Barnes' Camp (8,000 ft.).

B. Putnami, Cress., 1878.

♀ June 12, Ft. Collins; August 1, Lizard Head (Bali); ♂ August 30, Ward (7); August 17, Home (Ball). All these localities are high Alpine, 7,000 to 10,000 ft., Ft. Collins excepted. This species was described from one male collected by J. Duncan Putnam, probably at Empire City, a high Alpine species. Closely related to *Couperii* and *Edwardsii*. More abundant material is needed to base satisfactory determinations.

B. proximus, Cress., 1863.

♀ April 23, Horsetooth Gulch; July 21, Rist Canon; September 3, Vir. Dale. ♀ ♀ May 15, Ft. Collins; July 7, Westlake; August 18, Home (Ball); August 24, Vir. Dale; ♂ ♀ ♀ August 22, Cimmaron; August 23, Marshall Pass (Gillette).

B. proximus, var. *Coloradensis*, var. nov.

♀.—Black; face with yellow and black hairs; thorax banded with black; anteriorly yellow; scutellum with some black hairs mixed with yellow, especially along the sides; thorax beneath brownish-black; first two abdominal segments with black pubescence, third with fulvous yellow,—a few black hairs intermixed on basal margin; fourth to sixth with white hair, a high-power lens shows a few black hairs on the middle of fourth segment basally; a few pale hairs at extreme apical margin of second; posterior tibiæ and femora fringed with pale brown hairs, basal joint of posterior tarsi within very bright rufous, last four joints of all tarsi brownish; some pale hairs on fourth and fifth ventral segments; clypeus shiny, punctured; wings fuscous, tip of marginal cell very dark. Length, 20 mm.

Described from one specimen collected by me in Rist Canon (6,500 ft.), May 8, 1897. Easily separated from *proximus* or *Howardii* by the position and colour of abdominal pubescence.

B. Howardii, Cress., 1863.

♀ August 1, Beaver Ck. (10-12,000 ft.); August 23, Marshall

Pass, both by Prof. Gillette; and July 31, Ridgeway (Ball). ♂, Cimmaron, August 22 (Gillette).

The type specimen was taken at "Pike's Peak, Col. Terr.," by Mr. Winslow J. Howard. Prof. Cockerell records it from high altitudes in New Mexico. Mr. Ashmead writes me that he has never seen a queen of this species. It often is mixed with *B. proximus* in collections.

B. terricola, Kby., 1837.

This was determined for me by Mr. Ashmead; I had not recognized the species. ♀, Ft. Collins (C. Stannard).

B. Pennsylvanicus, De Geer, 1775.

B. americanorum, Fabr.

"*Apathus elatus*" in part.

I had the synonymy of this and the previous species mixed, but Mr. Ashmead kindly straightened out the matter for me, and gives me the above synonymy as correct, as far as *Pennsylvanicus* and *Americanorum* are concerned.

♀ June 9, 23, 29; ♀ July 23, August 8, 13; ♂ September 8, 17, 22; all at Ft. Collins.

♀ August 1, near Ft. Collins; June 30, near Foothills; July 8, Livermore; July 24, Vir. Dale; ♀ August 4, Julesburg (3 by Ball); August 7, 10, Rocky Ford.

B. Titusi, n. sp., Ashmead (in litt.).

♂.—Length, 16 mm. The abdomen dorsally covered with fulvous pubescence. One specimen September 10, 1898, Lamar (Gillette).

I had this specimen under *B. Pennsylvanicus*; Mr. Ashmead separated it out, and very kindly named it. The type is in the U. S. Nat. Mus.

B. ternarius, Say, 1838.

♀ May 3, 4, 12, 14, 19, 27, 28, April 16, 23; ♀ July 4, 20, August 6; ♂ August 5; all at Ft. Collins; ♀ May 16, Bellvue; ♀ July 8, 15, Livermore; July 31, Ridgeway; July 10, Lamar; July 27, September 3, Vir. Dale; July 20, Westlake; August 3, Durango; August 5, Antonito; ♂ Clear Ck. Can., July 18; July 7, Westlake; July 24, Vir. Dale; August 30, Ward; August 24, Glenwood Sprgs.; October 8, Salida.

This is the most common Colorado *Bombus*; it has been recorded heretofore from the State by Carpenter, "high Alpine," 1873; Dr. Uhler, Beaver Bk. Gulch, August 6; McCauley, "San Juan," 1877; J. D.

Putnam, from Empire, 1876; Prof. Cockerell, from Willow Ck., Custer Co., August 22; and by Dr. Rothrock, in 1872, from "Colorado"; and others.

B. rufocinctus, Cress., 1863.

♀ June 16, Ft. Collins; ♂ August 16, Horsetooth Gulch; both determined by Ashmead. Prof. Cockerell records this species from Custer Co., May 28, and August 19.

B. bifarius, Cress., 1878.

♀ May 28; ♂ August 26 (Bruner), at Ft. Collins; ♀ May 23, Boulder; ♀ ♀ July 7, Westlake; July 1, Rist Canon; ♀ August 23, Marshall Pass (Gillette); August 25, Alder; July 10, Lamar; ♀ ♂ August 22, Cimmaron; August 30, Ward; August 2, Muldoon (Ball); ♂ July 23, Palmer Lake; July 31, Ridgeway; August 14, Steamboat Springs.

B. sylvicola, Kirby, 1837.

♀ August 1, Lizard Head (Ball); ♀ August 25, Alder (Gillette); August 2, Muldoon; ♂ ♀ August 27, Marshall Pass; 1 ♀ 1 ♀ 1 ♂ August 30, Ward (Ball). All determined by Ashmead. Prof. Cockerell records it from Ula, Custer Co., July 30. It is certainly a distinct high Alpine species, and I had not recognized it.

B. juxtus, Cress., 1878.

♀ July 8, Livermore; ♀ July 20, Ft. Collins; July 23, Vir. Dale; August 2, Estes Park (Gillette); August 20, North Park (Ball); ♂ August 22, Palmer Lake.

I have seen a male from Woods Holl, Mass. (Gillette), that belongs to this species.

B. flavifrons, Cress., 1863.

♀ ♀ August 27, Marshall Pass; ♀ ♀ ♂, August 1, Lizard Head (Ball); August 30, Ward.

This species in general appearance sometimes resembles *B. juxtus*, but can be readily separated. Some specimens from Lizard Head are very bright, and the thorax has much more black anteriorly than in ordinary specimens.

B. Couperi, Cress., 1878.

♀ ♂ August 30, Ward; August 1, Lizard Head, all determined by Ashmead. Prof. Cockerell has stated that he did not feel warranted in separating *Couperi* and *Putnami* from *frigidus* after examining the types

of the two former. *Putnami*, as recognized in this paper and as determined for me by Mr. Fox and Mr. Ashmead, can be readily separated from *Couperi*.

B. Oregonensis, Cress., 1878.

♂ August 30, Ward; August 1, Lizard Head, several specimens collected by E. D. Ball and determined for me by Mr. Ashmead.

B. mixtus, Cress., 1878.

♀ Ft. Collins, May 22; ♀ August 5, 19, Cameron Pass; August 17, Home; August 30, Ward. I have seen no males, and what I take to be queens are rather small and some of them may prove to be workers.

B. sonorus, Say.

This has been taken in New Mexico by Prof. Cockerell, and is added to the Colorado list on authority of Mr. Ashmead. It is very closely allied to *B. fervidus*. Specimens I have seen can be readily separated. There is black pubescence on the sides of the thorax.

Mr. Ashmead, in his List of Colorado, Hymenoptera, recorded twenty-eight species of *Bombus*. I have included in the table the following, of which I have seen no specimen from this State: *Bombus affinis*, *B. hudsonicus*, *B. vagans* and *B. virginicus*. In this paper twenty of these species are given Colorado records.

The records from Prof. Cockerell referred to several times, are from his Custer County list.

I wish here to express my thanks for favours received from Prof. T. D. A. Cockerell, Mr. W. J. Fox and Prof. L. Bruner, and especially for the kind assistance of Mr. W. H. Ashmead. Prof. C. P. Gillette, under whom these studies were carried on, has ever been ready and willing to aid me in any possible way.

ANÆA ANDRIA IN INDIANA.

On April 27th, while collecting with my young son, Robert, the boy distinguished himself by capturing several ♂♂ of *Anæa andria*, at a point east of Richmond, Ind., not far from the Indiana-Ohio State line. The authorities give the habitat of *andria* as "Western States, from Illinois to Texas; Nebraska." No ♀♀ were seen, nor were any specimens seen in the fall. I presume that south-western Ohio can be considered its most eastern habitat. No apparent difference exists between the specimens referred to and material from Texas and other western points.

W. N. TALLANT, Richmond, Ind.

NEW BEES OF THE GENUS *ANDRENA*, FROM WISCONSIN.

BY T. D. A. COCKERELL, E. LAS VEGAS, N. M.

Andrena subcommoda, n. sp.

♀.—Length about 12 mm.; black; head and thorax with pale ochraceous or whitish hair, very short and thin on thoracic dorsum; head ordinary, facial quadrangle square; vertex behind the ocelli finely roughened and punctured; front below the ocelli punctured as well as grooved; facial foveæ broad, pale, closely adjacent to eyes; antennæ dark; clypeus thinly hirsute, shining, strongly but not densely punctured, no median smooth line; process of labrum truncate; maxillary palpi short; mesothorax shining, strongly but not densely punctured; metathorax very coarsely roughened, enclosure irregularly subreticulately ridged, but without a transverse bounding ridge; tegulæ dark, with a ferruginous spot; wings dusky with a yellow tint, nervures and stigma ferruginous, second submarginal cell broad; legs wholly dark; hind tibial spur of hind legs much curved; hair on inner side of basal joint of hind tarsi fulvous; abdomen shining, strongly and closely punctured, finely pubescent at sides, but without dorsal hair-bands; fimbria fulvous.

Hab.—Milwaukee, Wisconsin, June 11. (*Dr. S. Graenicher.*)

Differs from *A. Commoda* by not having ferruginous tarsi and hind tibiæ; also by the truncate process of labrum. By the latter character, among others, it differs from *A. pruni*.

Andrena Sigmundi, n. sp.

♀.—Length 10 mm.; black; pubescence brownish-white; head ordinary; cheeks densely and strongly punctured; antennæ dark; first joint of flagellum rather short; front below ocelli cribrately punctured; clypeus bare, very shiny, very densely and strongly punctured, with a narrow median impunctate line on the lower two-thirds; facial foveæ pale, narrow below, broadening gradually above; process of labrum truncate; mesothorax very strongly and densely punctured; scutellum the same; metathorax cribrate, very rough, enclosure with small vermiform plications and no transverse ridge; tegulæ piceous, with a brown spot; wings stained with yellowish; nervures and stigma dark ferruginous; first recurrent nervure entering second submarginal cell at the beginning of its last third; legs wholly dark; hair on inner side of basal joint of hind tarsi fuscous, shining coppery; abdomen suboval, shining, strongly and rather closely punctured; no hair-bands, but segments 4 and 5 fringed with shining hairs; fimbria auro-fuscous.

Hab.—Milwaukee, Wisconsin, May 26. (*Dr. S. Graenicher.*) This is very similar to *A. Forbesii*, but that species has a transverse ridge on the metathorax, and the punctures of the abdomen (especially the second segment) closer. Still, they are very closely allied.

Andrena multiplicata, n. sp.

♀.—Length about 9 mm. ; black ; head and thorax with stiff yellowish-white pubescence ; head ordinary, facial quadrangle square ; vertex with very large punctures ; front below ocelli cribrately punctured ; facial foveæ whitish, broad, closely adjacent to eyes ; antennæ dark ; clypeus polished, strongly and closely punctured, with a hardly defined median smooth line ; process of labrum rounded ; mesothorax and scutellum somewhat shining, with fairly close, large and deep punctures, those on scutellum very large and irregular ; base of metathorax very strongly longitudinally plicate, with a strong transverse ridge, the plicæ are about eight on each side of the middle line ; tegulæ piceous, with a pale margin and a fulvous spot ; wings dusky, with a yellowish tint, nervures and stigma dark ferruginous ; legs very dark brown, hind tarsi very dark ferruginous ; basal joint of middle tarsi rather broad ; hair on inner side of basal joint of hind tarsi light orange-fulvous ; abdomen strongly and closely punctured, punctures on basal part of second segment much smaller and closer than those on basal part of first ; segments 1 to 4 with lateral white hair-bands, those on 3 and 4 much narrowed medially, but nearly continuous ; fimbria fulvous.

Hab.—Milwaukee, Wisconsin, June 2. (*Dr. S. Graenicher.*) Belongs to the group of *A. rugosa*, and is allied to *A. Forbesii* and *A. grandior*.

Andrena radiatula, n. sp.

♀.—Length about 10 mm. ; black ; pubescence rather dense, reddish-brown dorsally, paler elsewhere ; abdomen not banded ; fimbria pale purplish-gray. This is closely similar to *A. Sigmundi*, but differs as follows : Head smaller, facial quadrangle narrower ; facial foveæ with a reddish tint, and narrowing more rapidly below ; clypeus hairy all over ; hair of thorax strongly reddish ; basal area of metathorax more regularly plicate and better defined ; third submarginal cell less narrowed above.

Hab.—Milwaukee, Wisconsin, June 16. (*Dr. S. Graenicher.*)

Andrena rufosignata, n. sp.

♀.—Length about 10 mm. ; black ; pubescence whitish, tinged with

yellow above, especially on the scutellum; head ordinary, facial quadrangle about square; antennæ rather long, flagellum dark ferruginous beneath towards end; cheeks tessellate and hardly or not punctured; front below ocelli striate; clypeus granular and dull at the sides, but disc strongly shining, with strong sparse punctures, the lower middle almost wholly impunctate; process of labrum rounded, broad, the end very slightly truncate; mesothorax minutely tessellate, dull, with shallow, hardly visible, punctures, median and parapsidal grooves distinct; scutellum slightly shining but not polished; base of metathorax granular, no transverse ridge; tegulæ piceous in front, dark reddish-brown posteriorly; wings nearly clear, apical margin slightly dusky; stigma clear ferruginous, nervures darker; legs dark, hair on inner side of basal joints of middle and hind tarsi fulvous; abdomen broad, tessellate-impunctate, without hair-bands; fimbria fulvous.

Hab.—Milwaukee, Wisconsin, May 19. (*Dr. S. Graenicher.*) When one looks at the head from above, the broad facial foveæ are seen to have a strong red tint, which is very distinctive of the species.

Andrena clypeonitens, n. sp.

♀.—Length about $9\frac{1}{2}$ mm.; black; pubescence pale ochreous, brighter on scutellum; head broad, facial quadrangle somewhat broader than long; antennæ dark, flagellum very faintly reddish towards tip; front below ocelli striate; disc of clypeus bare, sparsely punctured, with a large shining impunctate space; process of labrum broad and rounded; facial foveæ pallid, rather broad, adjacent to eyes; mesothorax dull, minutely tessellate, impunctate; basal area of metathorax dull, defined only by absence of hair; tegulæ very dark brown; wings smoky, nervures dark brown, stigma dark ferruginous, with a dark brown margin; second submarginal cell nearly square; legs black, the three first small joints of tarsi deep ferruginous; hair on inner side of basal joint of hind tarsi fuscous, shining coppery; abdomen tessellate-impunctate, with continuous white hair-bands, that on the first segment reduced to a few scattered hairs, those on the others dense and conspicuous; fimbria and hair of penultimate segment dark purplish-gray.

Hab.—Milwaukee, Wisconsin, Aug. 19. (*Dr. S. Graenicher.*) A species of the group of *A. solidaginis* and *A. xanthigera*. The clypeus will at once separate it from *A. solidaginis*, which occurs in the same region.

SOME NEW OR LITTLE-KNOWN BEES—II.

BY CHARLES ROBERTSON, CARLINVILLE, ILLINOIS.

In my neighbourhood I find the typical *Andrena Cressonii*, Rob., and the form described below as *A. dubia*, the latter more rare. To compare this with the form described as *A. Bridwellii*, Ckll., I have obtained from Mr. Bridwell for examination thirty-three specimens taken by him at Baldwin, Kansas, and labelled *A. Cressonii*, *A. Kansensis*, and *A. Bridwellii*.

A. Kansensis is the same as *A. Cressonii*, the colour of the pubescence being characteristic of unfaded specimens. Local specimens sometimes have the hind tibiae and tarsi ferruginous in both sexes.

A. Bridwellii seems to be the common form at Baldwin. It differs from the typical *A. Cressonii* in the characters mentioned below. Some specimens have the flagellum testaceous beneath and some have the tarsi and hind tibiae more or less ferruginous. It is intermediate between *A. Cressonii* and *A. dubia*. If I should find *A. Bridwellii* in my neighbourhood, I would regard them all as *A. Cressonii*. As it is, they may be only variant forms of *A. Cressonii*, but I have thought it well to separate *A. dubia* provisionally and to let *A. Bridwellii* stand on the same basis. The validity of both depends on the discovery of characters which will enable one to separate the females from each other and from females of *A. Cressonii*.

Joint 3 of antennae shorter than 13, about as long as 5, entire apical margin of clypeus black, lateral face marks small or

wanting. *A. dubia*, sp. nov.

Joint 3 of antennae as long as 13, and as long as 4 and 5 together.

1.—Middle of anterior margin of clypeus black, lateral face marks large. *A. Cressonii*.

Entire apical margin of clypeus black, lateral face marks small or wanting. *A. Bridwellii*.

DIALICTUS, gen. nov.

This is proposed as a new genus for the reception of *Halictus anomalus*, Rob., as the type. The species was described from two specimens, and I suspected that I might find examples with three cubital cells and that the males might not differ from the ordinary dull greenish *Halictus*, except in the venation. But the male differs from all of those species of *Halictus* known to me in having the antennae short, the joints hardly longer than wide, joint 3 hardly longer than

2. The flagellum is usually dark, but sometimes it is testaceous beneath. I have 3 ♀ and 5 ♂ specimens.

Nomada denticulata, sp. nov.

Nomada articulata, Rob., Tr. Am. Ent. Soc., xxii.: 124, ♂, 1895 (nec Sm.).

Nomada articulata, Rob., Tr. Acad. Sci., St. Louis, viii.: 51, ♀, 1898.

Synhalonia Illinoensis, sp., nov.—♂. Differs from *S. atriventris* ♂ in joint 3 of antennæ being one-half as long as 4. The form *fuscipes* of *S. atriventris*, Tr. Acad. Sci., St. Louis, x.: 54, may be a distinct species, and this may be the male of it.

Agapostemon pulcher, Sm.—When writing the account of the local species of *Agapostemon*, in Tr. Acad. Sci., St. L., vii.: 325–30, I found no males of *A. radiatus* farther west than Nebraska, though I have since seen them from Colorado. A form resembling *A. radiatus* ♀ was identified as *A. pulcher*, Sm. *A. femoratus*, Crawford, Nebr. Acad. Sci., vii.: 162, was identified as the male.

Megachile petulans, Cresson (Trans. Am. Ent. Soc., vii.: 127, ♂, 1878).

♀.—Quite short and robust, the edge of the vertex passing before a line drawn between the posterior margins of the eyes, one of the posterior ocelli, therefore, nearer the vertex than to the neighbouring eye.

This was identified for me by Mr. Cresson as *M. optiva* ♀, and I have indicated *M. petulans* as the male of that species, in Trans. Acad. Sci., St. Louis, vii.: 350, 1897. Lately, through the kindness of Dr. Skinner, I have had an opportunity to examine the two type specimens of *M. optiva*. They belong to two species, and neither of them is the female of *M. petulans*. One of them is, I think, the female of *M. facunda*. The two species and *M. sexdentata*, Rob., may be separated as follows:

Middle metatarsus narrower than its tibia, apical ventral segment of abdomen not reflexed, anterior margin of clypeus entire... *M. optiva*, pt.
Middle metatarsus as broad as its tibia, apical ventral segment of abdomen reflexed..... I.

1.—Apical margin of clypeus with a median and two lateral teeth, *i. e.*, 5-toothed..... *M. optiva*, pt.

Apical margin of clypeus smooth and shining, with a median dentiform carina..... *M. sexdentata*.

In the preceding paper, CAN. ENT., XXXIII., 229, sixth line from the bottom, "anal rims" should read "anal rima"; and on page 230, "*obliqua*," repeated thrice in italics, should read "*desponsa*."

ADDITIONAL NOTES ON THE LIFE-HISTORY OF *ARCTIA*
PHALERATA, HARR.

BY ARTHUR GIBSON, DIVISION OF ENTOMOLOGY, CENTRAL EXPERIMENTAL
FARM, OTTAWA.

In the December number, 1900, of this journal, page 369, the writer published the life-history of the above Arctian. During the past summer, through the kindness of Mr. A. Kwiat, of Chicago, in forwarding eggs of *A. phalerata* (laid 18th June), I have had the opportunity of still further studying this species, and, as these larvæ varied considerably from those described in 1900, the following notes were made:

In the larval stages i, ii and iii those bred in 1901 answered well to my former descriptions. In stage iv the larvæ were not so black as the specimens reared the previous year, but many of them showed the dorsal stripe. This stripe was also present in stage v, besides which 40 of the larvæ possessed a series of pale orange spots on sides between tubercles ii and iii, and iii and iv, and the skin of the body in a line with the upper spots (between tubercles ii and iii) was slightly grayish, not black like the rest of the skin; this and the spots gave the appearance of a faint lateral band, distinguishable on all segments but 2 and 13. In stage v in 1900 none of the larvæ showed the dorsal stripe. In stage vi last season all of the 123 specimens, with the exception of 2, showed a distinct orange dorsal stripe, but in a few specimens this was faint. In 1900 the specimens did not show a dorsal stripe in this stage. In stage vii the larvæ were much larger the past season than those bred the previous year. The mature larvæ in July, 1900, measured 30 mm. at rest; those in July, 1901, averaged 42 mm. in length, and all the specimens but 9 showed the distinct dorsal stripe, expanded in the middle of each segment, or the series of elongated spots noted in my previous description of this stage. In many of the larvæ the stripe was present on all the segments, but was particularly wide and distinct on segments 5 to 13, inclusive.

In stage vi in 1900 the width of the head averaged from 2.0 to 2.4 mm. The past year some of the heads were 2.6 mm. wide. In stage vii also in 1900 the width of the head, as given in my description, was 2.5 to 2.8 mm. In July, 1901, the widest head measured 3.4 mm. The chief variation in the mature larvæ bred the past season was in the colour of the bristles. In many specimens the bristles from all the tubercles, with the exception of a few short bristles from the tubercles above the spiracles, were of a decidedly pale grayish colour, tipped with black; in

others the bristles were more of a yellowish tinge, those from tubercles on segments 2, 3 and 4 being slightly rusty. In these specimens the skin of the body was not so black, and did not have the velvety appearance which the larvæ with the black bristles from dorsal tubercles had. In some larvæ all the bristles, with the exception of a few black ones from tubercles above spiracles, were a pale rust-red, those from tubercles on segments 2, 3 and 4 being brighter. In most cases the bristles from tubercles above spiracles of larvæ bred in 1900 were black, the only exception being that in some specimens all the dorsal tubercles bore a very few bristles of a dark rusty colour; none, however, possessed any pale grayish or yellowish bristles as above mentioned.

On the 14th July, 1901, some of the specimens had changed to pupæ, and on the 23rd July the first moths emerged. Early in August 2 males and 2 females, which had just emerged, were placed in a cage out of doors, and another batch of eggs were secured. These hatched in due course, and about 32 of the larvæ passed through all their stages by the 1st September, and by the 14th and 15th the first moths of this brood appeared, the date of the last emergence being 14th October. The larvæ which did not pupate, having showed signs of hibernation, were placed in a cool cellar on the 21st October, to be afterwards put outside for the winter.

In 1900 there was a remarkable lack of variation in the moths bred, but this cannot be said of those reared the past year. While the majority, however, did not show any material variation, yet in some specimens the W mark on the primaries was indistinct, and in a few moths (females), nearly obsolete. In fact, there was much variation as to the width of all the bands on the primaries. In some specimens these were quite wide, in others the bands were narrow. Then, again, the colour of the secondaries in four of the females reared was quite yellow, almost as yellow as the secondaries of the males. In the moths of the two broods bred the past season, the black edging of the primaries in both sexes was more in evidence than those reared in 1900.

South Kensington Museum loses a distinguished lepidopterist in Dr. A. G. Butler, the head of the entomological section, who retires under the age limit after nearly forty years' connection with the zoological department. Dr. Butler is a great authority on African butterflies, and he has also won world-wide reputation as an enthusiastic ornithologist. It is stated that his successor will be Sir George Hampson.—*London, Eng., Daily Telegraph.*

THE ACADEMY OF SCIENCE OF ST. LOUIS.

At the meeting of the Academy of Science of St. Louis, on the evening of January 6, 1902, Mrs. Wm. Bouton, on behalf of herself and a considerable number of other persons, presented to the Academy a collection of 633 butterflies mounted on Denton tablets, on condition that the collection should be made accessible to the public.—WILLIAM TRELEASE, Recording Secretary.

A CORRECTION.

Before venturing to send my Synonymic Notes for publication, I made a careful search of the entomological literature accessible to me, but a few days after I had returned the corrected proof, I found in a work which I had just added to my library the name *Euchates*, Lec., cited as a synonym of *Eunyssobia*, Casey.

I immediately telegraphed to the editor to suppress the name *Epeuchates* which I had proposed, and that I would pay the expense of resetting and reprinting the pages involved. I was too late, unfortunately, as the number was complete and ready for mailing, and as its issue had already been retarded by other causes, the editor did not deem it expedient to further delay it.

Since the appearance of my notes I have been favoured with a letter from Mr. Samuel Henshaw, informing me that the name *Euchatias* proposed by me is unnecessary, and that Harris's name, *Euchates*, is tenable on account of Dejean's *Euchates* being a "nomen nudum," a mere list name, and that the date of Dejean's work was 1833, not 1834.

Dejean's work was not accessible to me, but I thought I was safe in depending upon Dr. Scudder's "Nomenclator Zoologicus," in which the first use of the term is credited to Dejean in 1834, and I supposed that the first use of a term given would be valid. I am by no means sure that the invalidity of mere catalogue names has always and universally been recognized, though I quite agree that they should not be accepted. I may say that the entomological editors of the Century Dictionary followed Dr. Scudder's work in regard to this name.

It is with the keenest regret that I find myself in what Dr. Skinner has delicately referred to as the "synonymic consommé."

Montreal, 23rd Jan., 1902.

H. H. LYMAN.

Mailed February 4th, 1902.

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The Canadian Entomologist

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No. 3.

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EDITED BY

REV. C. J. S. BETHUNE,

LONDON, ONTARIO.

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1902.

EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

FOR EXCHANGE.—Fine papered specimens of *Thecla wittfeldii*, *Lycæna isophthalma*, *Heliconia charitonia*, *Oligaria maculata*, etc., for North American butterflies, in papers, in first-class condition. WALTON I. MITCHELL, 1721 Mount Vernon St., Philadelphia, Pa.

OFFER named European hymenoptera in exchange for N. Am. hymenoptera. Refer to Prof. Grote. J. D. ALFKEN, 18 Delmestr., Bremen, Germany.

LEPIDOPTERA.—*Papilio palamedes*, *Calephalis borealis* and many others to exchange. Would like to receive lists. JOHN & HURD COMSTOCK, 1572 Ridge Ave., Evanston, Illinois.

LEPIDOPTERA.—Pupæ and imagoes of nearly all N. Am. Sphingidæ and imagoes of Arctians desired in exchange. HENRY ENGEL, P. O. Box 369, Pittsburg, Pa., U. S. A.

WANTED.—Erycinidæ of the world. Also butterflies from the Western and North-western States. Offer Diurnes from Central and South America, in faultless condition. LEVI W. MENGEL, Boys' High School, Reading, Pa.

DIPTERA.—Wanted, as many Asilina as possible from all parts of North America. Write for particulars to PROF. C. H. FERNALD, Amherst, Mass.

WANTED.—Ants and Termites. Specimens and literature for exchanges. H. WOLFF, S. J., Canisius College Museum, Buffalo, N. Y.

WANTED.—Nos. 3 and 6 of Vol. 8 of the Entomological News. FRANK E. WATSON, 974 E. 168th St., New York, N. Y., U. S. A.

LEPIDOPTERA.—Fine bred specimens of *Catocala illecta* and *minuta* for exchange. Also *Nathalis iole*, *Anæa andria*, etc. Want *Catocalæ*, butterflies and sphinges. G. M. DODGE, Louisiana, Mo.

WANTED.—American silk-producing Lepidoptera. Directions for the rearing of wild silkworms can be obtained from the author. For terms, address ALFRED WAILLY, Branksome, Upper King's Road, Kingston Hill, London, Eng.

FOR EXCHANGE.—Butterflies of this neighbourhood, for those not in my collection. Have also a number of chrysalids of *Feniseca tarquinius* for exchange. Address: WILMON NEWELL, Wooster, Ohio.

ORTHOPTERA.—Wanted, specimens and literature for exchange. FRANK E. LUTZ, Zoological Bldg., University of Chicago, Chicago, Ill.

A NEARLY complete set of U. S. Agricultural Reports for exchange for some works on Entomology not in my library. Please make offer. GEORGE B. KING, Lawrence, Mass.

ACULEATE HYMENOPTERA, especially Apoidea, wanted. Will give good exchange in Coleoptera or Hymenoptera. E. S. G. TIRUS, Urbana, Ill.

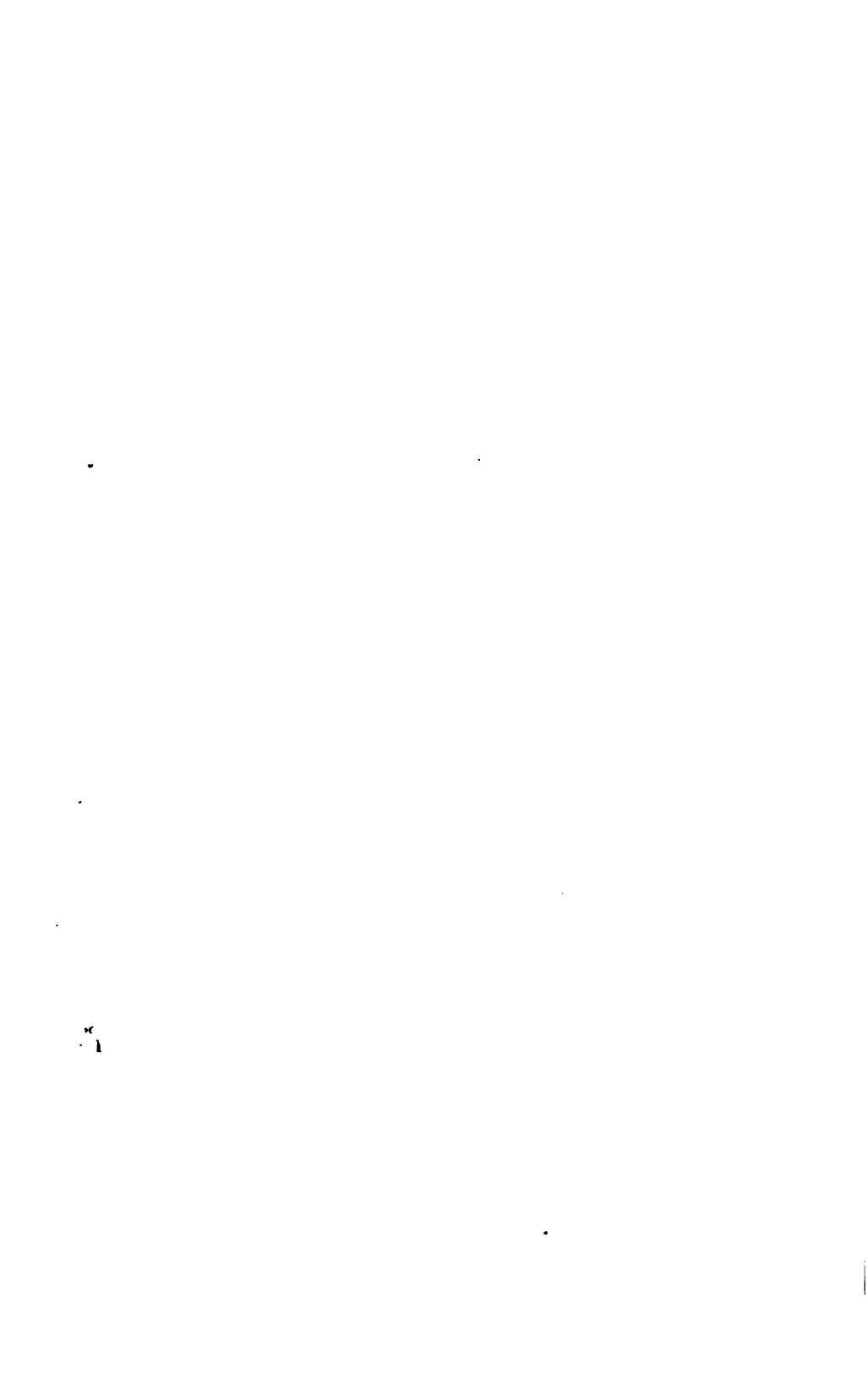
WANTED.—Cicindelidæ, Carabidæ, and rare Scarabæidæ. Will give good exchange in Exotic and rare European Coleoptera (named), also Odonata and Hymenoptera from N. America. Send list to R. J. WEITH, Elkhart, Indiana.

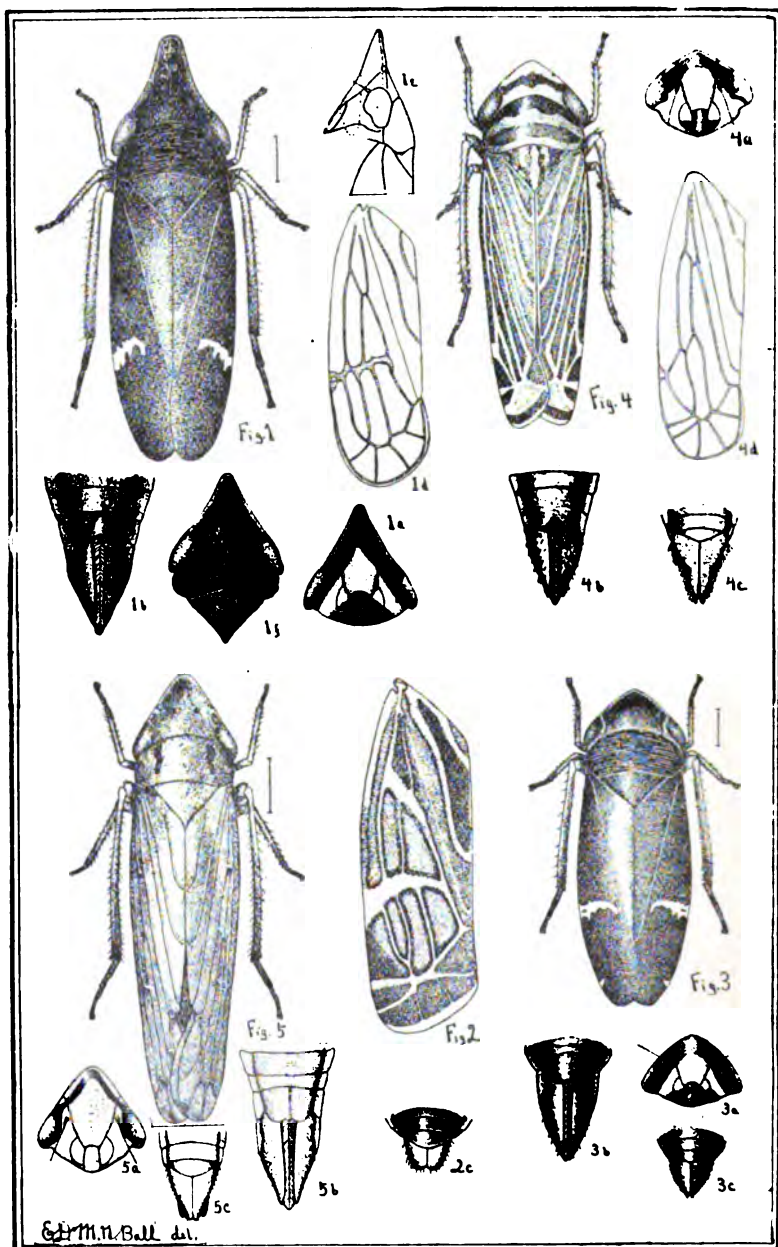
DIPTERA wanted from Washington and British Columbia in exchange for North American Coleoptera. W. S. HUNTINGTON, 1910 N. Twenty-first St., Philadelphia.

PAPILIOS *brevicauda*, *nitra*, *Oregonia*, *indra*, female, *nezahualcoyott* wanted; also Cicindelidæ, *Cychrus*, *Carabus* and *Calosoma*. Will give liberally in exchange. GEO. A. EHRMAN, 2314 Sarah Street, Pittsburg, Penna.

LEPIDOPTERA.—I have a large number of both mounted and papered specimens for exchange. All are 1900 captures. Correspondence in both English and German. Address: A. KWIAT, 701 Larrabee St., Chicago, Illinois, U.S.A.

LEPIDOPTERA, in papers, of Canada and U. S. A., wanted in good exchange for fine Lepidoptera of Europe, Asia, South America. I take only first-class quality. Please to write Smith's number upon the paper. WILHELM NEUBURGER, Lepidopterist, Berlin, S. 42, Luisen-Ufer 45, Germany.





JASSIDÆ - THE GENUS COCHLORHINUS AND ITS ALLIES

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No. 3

THE GENUS COCHLORHINUS, UHLER, AND ITS ALLIES (JASSIDÆ).

BY E. D. BALL, FORT COLLINS, COLO.

Some time ago Dr. Uhler was kind enough to lend me the types of *C. pluto* for study in connection with some allied material from the National Museum. This new material, while generically distinct, is so closely allied to *Cochlorhinus* in many ways, and at the same time possessing more nearly the typical Acocephaline characters, that it is now possible to assign this unique genus to an approximately correct position in the group, and give its characters from a comparative standpoint.

It is apparently a rare form, as the three original females taken more than twenty-five years ago are the only known specimens of the species. To make this nondescript form more accessible to the workers in the group, and as a basis for the comparisons in the descriptions that follow, it has been thought best to give a comparative description of the genus and species, and also a figure of the type, together with its more important details.

Genus COCHLORHINUS, Uhler.

Uhler, Bull. U. S. Geol. and Geog. Surv. II., p. 358, 1876. Van Duzee Cat., p. 289.

Related to *Acocephalus*, but quite distinct; vertex slightly longer than broad, acutely angled, disc flat, with the margins slightly elevated, ocelli on the margin almost one-third the distance to the apex. Face retreating, acutely angled with vertex, concave in profile. Front narrow, convex, a distinct ridge extending to the apex, either side of which the margin is depressed and slightly foliaceous. Pronotum transverse, coarsely transversely rugulose, the margins nearly parallel, the anterior slightly more curved. Elytra coriaceous, the nervures raised, apical margin broadly rounding, with a narrow appendix; venation definite, two cross nervures

between the sectors, three anteapical cells, the outer one usually stylated at its apex; five apical cells, the first triangular, the three following broadly wedge-shaped, and the fifth similar to the anteapical cells; their bases and the base of the fifth apical, which is usually either a forked or double nervure, broadly embossed with white obscuring the actual course of the nervures.

The flat vertex with its slight margin, the coriaceous elytra with the raised nervures, and the ocelli distant from the eyes, will place this in the *Acocephalinae*; at the same time the whole vertex and front strongly suggest the genus *Platymetopius*, and the pattern of venation approaches that found in some species of that genus. Whether this indicates relationship or similar lines of development can be more easily answered when the habits and life-history have been studied, and other of its relatives have been found.

Cochlorhinus pluto, Uhler. Plate 2, fig. 1.—Elongate, subparallel; vertex acutely angled, the apex produced. Black, with an irregular band on the elytra behind the middle, and a triangle across the face, white. Length, 6 mm.; width, almost 2 mm.

Genus UHLERIELLA, n. gen.

Resembling *Acocephalus* in form and general appearance, but with the ocelli on the sharp vertex margin, and the venation quite distinct and resembling that of *Cochlorhinus*. Vertex slightly, obtusely angled, nearly half wider than long in the female, still shorter in the male, not quite as long as the pronotum, disc sloping, the margin flat or slightly upturned; ocelli on the margin not quite twice as far from the apex as from the eyes. Face slightly, evenly rounding, front wedge-shaped, the margins nearly straight; in profile straight or slightly convex, never concave nor with a median ridge. Clypeus parallel margined, a trifle rounding at apex. Pronotum as in *Cochlorhinus*; lateral margins rounding almost from eyes, posterior margin emarginate. Elytra rather broad, varying from coriaceous to subhyaline, slightly obliquely truncate posteriorly, with the angles rounded; venation resembling that of *Cochlorhinus*, the outer anteapical usually stylated and with two slightly divergent nervures from the apex to the costa, these nervures, and often forkings of the sectors, obscured by the white embossing.

Type *U. Coquilletti*, Van Duzee.

In the general plan of venation and the white embossing, the shape of the pronotum and the transverse light band on the face this genus

approaches closely to *Cochlorhinus*, but in the shape of the vertex and front, which are the dominant characters in this group, it is widely divergent, and approaches most closely to *Acocephalus*, from which, however, the position of ocelli and venation renders it quite distinct.

KEY TO THE SPECIES.

A Elytra short and stout, a transverse white band across the bases of the anteapical cells reaching the costa, outer anteapical stylate, ~~its~~ outer nervure straight or slightly rounding before the juncture. Face half or more than half black.

B Vertex and pronotum with alternate bands of black and light.

Elytra with the nervures and transverse bands light. Male plates individually rounding at apex... *Coquilletti*, V.D.

BB Black except for the transverse band on the elytra and dot at apex. Male plates acute at apex... *stygica*, n. sp.

AA Elytra longer and narrower, without transverse white marking, and lacking the second cross nervure; outer anteapical cell angled out nearly to the costa. Face more than half light... *signata*, n. sp.

Uhleriella Coquilletti, Van Duzee. Plate 2, fig. 2.—*Deltocephalus Coquilletti*, Van Duzee, Ent. Americ., VI., p. 95, 1890.—Cat. p. 293. Form of *stygica* nearly, but broader and with more flaring elytra; vertex and pronotum of same form and colour pattern as in *signata*, elytra broad, clavus black with the nervures broadly light, corium brown, the nervures narrowly light, an oblique band across the first cross nervure, a transverse band across the second, a band across the base of the apical cells forked at each end, and the narrow apical margin, milk white.

This species is somewhat intermediate in form between the two following and by itself might not be recognized as being related to *Cochlorhinus*, but when compared with *stygica* this relation is at once evident.

Uhleriella stygica, n. sp. Plate 2, fig. 3.—Form of *Coquilletti* nearly, slightly smaller and with a longer and more rounding vertex. Shining black, a transverse band on elytra and another on face, white. Length, ♀ 4.5 mm., ♂ 4 mm.; width, 1.5 mm.

Vertex slightly sloping, transversely depressed, the margin sharp, half wider than long in female, almost twice as wide in the male, slightly obtusely angled, with the apex rounded off. Pronotum distinctly transversely rugose; elytra coriaceous, but little longer than body, compressed at tip; venation resembling that of *C. pluto*.

Colour: black above, a raised transverse band extending from the costa across the bases of the anteapical cells and running out a little on each nervure, milky white; the tip of the fourth apical nervure is also white. Below black, a broad crescentiform band across the face, the tibiae and tips of all the femora, yellowish white.

Genitalia: female segment nearly twice as long as the penultimate, posterior margin rounding, with a slight median emargination. Male valve roundly triangular, about as long as the ultimate segment; plates broad, roundly triangular with the apices acute, nearly three times the length of the valve.

Described from eight specimens received from the National Museum; from Kern Co., Calif. Coquillett collector.

Uhleriella signata, n. sp. Plate 2, fig. 4.—Closely resembling *Coquilletti*, larger and with longer elytra, pattern of marking similar, but without the two white bands on elytra. Length, 5–5.5 mm.; width, 1.75 mm.

Vertex slightly sloping, flat or slightly transversely depressed, not quite twice wider than long, a little over half as long against eye as on middle; face as in *Coquilletti*, front narrow, wedge-shaped. Pronotum more strongly convex in front than in *Coquilletti*, emarginate posteriorly with the outer angles rounded. Elytra long and rather narrow, subhyaline towards the margins, the apex roundly truncate. Venation resembling *Coquilletti* in general pattern, but with the outer anteapical cell angled out nearly to the costa and lacking the white bands on the cross nervures, two apical nervures arise from the exposed outer face of the central anteapical cell and run nearly parallel to the costa, forming a long narrow cell; the second cross nervure wanting.

Colour: vertex pale yellow, a transverse band just before the middle, parallel with the posterior margin, testaceous brown. Pronotum with four transverse bands parallel with the anterior margin, the anterior one testaceous brown, the next pale creamy or slightly greenish yellow, the third, which does not reach the lateral margins, light testaceous, posterior margin greenish white. Scutellum pale yellow, with large triangular black spots in the basal angles and a pair of interrupted stripes across the disc. Elytra brown, darkest on the clavus, shading out to subhyaline along the margin, the sutural margin and claval sutures narrowly light, nervures, except the apical ones, broadly so; apical margin narrowly milk white, bordered inside by a wider smoky band, the bases of the

apical cells hyaline white in sharp contrast. Face pale yellow, a black band across between the eyes, narrowed on the front and emitting a line under the vertex margin, clypeus and lower third of loræ, black.

Genitalia : female segment long and narrow, over twice the length of the penultimate, narrowing posteriorly and terminating in two rounding lobes separated by a broad notch ; male valve obtusely triangular, as long as the ultimate segment, plates broader than the valve, long triangular, over four times as long as the valve, their margins clothed with long silky hairs.

Described from eleven specimens from the National Museum ; from Los Angeles Co., Calif. Coquillett collector.

In shape and colour marking of vertex and pronotum this species and *Coquilletti* are almost identical, but the venation of the elytra as well as its colour pattern is quite different, and the genitalia are distinctive. Those who consider the presence or absence of the second cross nervure a good generic character would place these two species in different genera.

Genus HULERIA, n. gen.

Form long and narrow, almost parallel margined, vertex longer and more angulate than in *Parabolocratas*, as long as its basal width, one-third longer than the pronotum in the female, two and one-half times as long on middle as against eye, disc flat, the margins inclined to be elevated ; ocelli on the margin about one-fourth the distance from eye to apex. Face in profile perfectly flat, retreating as strongly as in *Hecalus*, transversely convex ; the front broad above, the margins straight from the ocelli to the rather small, parallel margined, clypeus. The upper part of the front has a quite definite median ridge, which becomes narrower and more elevated as it approaches the apex of vertex, leaving a narrow compressed margin to the vertex. Pronotum twice wider than long, the anterior and posterior margins nearly parallel, lateral margins straight ; elytra very long and narrow, evenly rounding at the apex, with a very narrow appendix ; venation as in *Thamnotettix*, the anteapical cells very long, extending more than half their length beyond the apex of clavus, apical cells very short and regular.

Type of the genus *H. 4-punctata*.

The elevated ridge on front and general shape of face and vertex are very similar to *Cochlorhinus*, but the venation and general shape of the elytra are quite different.

Huleria 4-punctata, n. sp. Plate 2, fig. 5.—Pale dirty yellow; four spots across the vertex in front of the eyes; two irregular stripes on pronotum, and a stripe under the edge of the vertex, black. Length, 7 mm.; width, 1.5 mm.

Vertex acutely angled, with the apex bluntly rounding, slightly upturned; eyes small, slightly wider than pronotum. Pronotum transverse, roundly or slightly angularly emarginate posteriorly. Elytra with the nervures distinct, two claval nervures, long, straight and parallel with the suture; but one cross nervure between the sectors, the inner antepical cell much longer than outer, often an extra apical nervure arising from the apex of the outer antepical, forming a small subquadrate cell.

Colour: vertex pale yellow, a pair of angular black spots on the margin between the ocelli and eyes, another pair on the disc slightly in advance of these; eyes reddish brown. Pronotum dirty straw, a wavy black stripe running back from the inner corner of each eye, but not reaching the posterior margin; elytra dirty straw, slightly tinged with brown, the nervures and margins pale and quite distinct. Face and below pale creamy yellow, a parallel margined black stripe half its own width below the margin of the vertex, and extending back under the eye.

Genitalia: female segment nearly half longer than penultimate, narrowing posteriorly; posterior margin slightly rounding, with an abrupt subquadrate notch; a short strap-shaped tooth almost fills this notch (a quite marked median carina in this specimen); male valve as broad as the ultimate segment and a little longer, posterior margin evenly rounding, plates nearly as wide as the valve and three times as long, roundly narrowing two thirds of the distance, and then produced as two finger-like tips, margined with short weak hairs.

Described from one female and two males from the National Museum collection, labelled "Los Angeles Co., Calif. Coquillett collector."

EXPLANATION OF PLATE 2.

Fig. 1.—*Cochlorhinus pluto*, Uhler. Female from type.

a, face; b, ♀ genitalia; c, ♂ genitalia; d, elytron, showing venation and embossing; e, profile of face; f, head and pronotum of co-type.

Fig. 2.—Elytron of *Uhleriella Coquilletti*, Van Duzee, showing venation and pattern of marking. c, ♂ genitalia.

Fig. 3.—*Uhleriella stygica*, n. sp. Female.

a, face; *b*, ♀ genitalia; *c*, ♂ genitalia.

Fig. 4.—*Uhleriella signata*, n. sp. Female.

a, face; *b*, ♀ genitalia; *c*, ♂ genitalia; *d*, erytron, showing venation.

Fig. 5.—*Huleria 4-punctata*, n. sp. Female.

a, face; *b*, ♀ genitalia; *c*, ♂ genitalia.

FURTHER NOTES ON MASSACHUSETTS COCCIDÆ.

BY GEORGE B. KING, LAWRENCE, MASS.

Since the publication of my last contribution on the Massachusetts *Coccidæ*, in 1899, no less than 34 other species have been found to inhabit Mass., some of which appear to be of recent introduction and new to the United States; and while the larger portion has been recorded from other States, we have found several interesting new species hitherto not known to science. I have abandoned in part the citation of the geographical distribution and many of their food-plants, as time will not permit me to consult some of the literature. I have included an additional check-list and the Bibliography. In the original check-list several species are listed whose names have since been changed as follows. Those in heavy type are the old names, while those now considered correct are in *italics*:

<i>Dactylopius adonidum</i> , L.	<i>D. longispinus</i> , Targ.
<i>Lichtensia viburni</i> , Sign. var.	<i>Pulvinaria Cockerelli</i> , King.
<i>Aspidiotus ficus</i> , Ashm.	<i>Chrysomphalus aonidum</i> , L.
<i>Parlatoria Pergandii</i> , Comst.	<i>P. proteus</i> , var. <i>Pergandii</i> .
<i>Mytilaspis pomorum</i> , Bouché.	<i>Mytilaspis ulmi</i> , L.
“ <i>citricola</i> , Pack.	“ <i>Beckii</i> , Newm.
<i>Gossyparia ulmi</i> , Geoff.	<i>G. spuria</i> , Modeer.
<i>Asterolecanium quercicola</i> , Sign.	<i>A. variolosum</i> , Ratz.
<i>Lecanium hemisphæricum</i> , Targ.	<i>Saissetia hemisphærica</i> , Targ.
“ <i>filicum</i> , Boisd.	“ <i>filicum</i> , Boisd.

The following are additions to the Mass. list:

Dactylopius nipæ, Mask. Found for the first time in the U. S., in the Harvard botanical greenhouse at Cambridge, Mass. *Introduced*.

Kermes Pettiti, Ehrh., 1899. A very common species on oak throughout the State, and seems to have been taken and mixed with *K. galliformis* for a long time. *Native*.

Kermes Andrei, King, 1900. Described from Lawrence, Mass., on oak; has been found in Georgia; it is a pretty and clearly a distinct species. *Native*.

Kermes Perryi, King, 1900. As yet only known from Mass. on oak. *Native*.

Lecanium lauri, Boisd., 1735. Found on *Laurus nobilis*, Springfield, Mass., by Dr. G. Dimmock. The small tree was so badly infested that it died. It has been found in France and New Zealand. *Introduced*.

Eulecanium cerasifex, Fitch, 1856. On wild and cultivated cherry trees at Andover and Lawrence, Mass., but not in sufficient numbers to cause any alarm. *Native*.

Eulecanium quercitronis, Fitch, 1856. This is found on *Ulmus Americana* at Methuen, Mass., on *Xanthoxylum Americanum* at Cambridge, Mass., and on *Ulmus Americana* in company with *Chionaspis Americana*. *Native*.

Eulecanium armeniacum, Craw. Dr. Dimmock sent this from Springfield, Mass., infesting *Prunus serotina*. *Native*.

Eulecanium tulipiferae, Cook, 1878. Probably *E. liriodendri*, Gmel., on *Liriodendron tulipifera* at Springfield, Mass. Coll. Dimmock. *Introduced*.

Saissetia oleæ, Bern., 1782. Found on a small shrub out of doors in the Harvard botanical garden at Cambridge, Mass. *Introduced*.

Saissetia, sp., resembling *oleæ*, but not that species, was found at the same place in one of the greenhouses, on *Cycas revoluta*, but not sufficient for proper study. *Introduced*.

Eulecanium pruinatum, Comst., M. S. Coql., 1891, was found on *Prunus domestica*, var. *Bradshawi*, at the Harvard botanical garden, Cambridge, Mass. *Native*.

Lecanium longulum, Dougl., on *Monstera deliciosa*, in the Harvard tropical greenhouse, Cambridge, Mass. *Introduced*.

Lecanium melaleuca, Mask., 1898, at the same place and on the same plant. It is new to North America. *Introduced*.

Eulecanium pyri, Schr., was found on pig-nut hickory at Andover, Mass. Although there were apple trees near by, none of these scales were found on them. *Introduced*.

Eulecanium Kansasense, Hunter, 1899, described from Kansas on *Cercis Canadensis*, was found on shadbush at Methuen, Mass. *Native*.

Eulecanium Websteri, Ckll. and King, 1901. This has been found

on high-bush blueberry and *Spiræa* at Lawrence, and on white birch at Methuen, Mass. *Native*.

Pulvinaria Cockerelli, King, 1899. A common species on *Spiræa salicifolia* and *Prinos verticillatus* at Lawrence and Methuen, Mass. *Native*.

Pulvinaria acericola, W. and R., 1868. This was found by Dr. Dimmock at Springfield, Mass., on maple in deep woods. *Native*.

Pulvinaria phaia, Lull., 1899 (probably identical with *P. floccifera*, Westw.), was found by Mr. Cooley in the college greenhouse at Amherst, Mass., on orchid (*Phaius maculatus*). *Introduced*.

Aspidiotus abietis, Schr. *A. pini* is the same. This was found on pine at Forest Hills, Mass. (Mus. Comp. Zool.). It was communicated by Mr. Samuel Henshaw to Mr. Cockerell. *Introduced*.

Aspidiotus rapax, Comst., 1881. Found on *Coprosma Baueriana* at the Harvard botanical garden, Cambridge, Mass. *Native*.

Aspidiotus Britannicus, Newst., 1898. Described from England in 1898, and the same year was found at Salem, Oregon, on holly, and in 1900 found in abundance on holly at the public gardens, Boston, Mass. *Introduced*.

Aspidiotus juglans-regiæ, Comst., 1881, was found on English walnut at Methuen, Mass. *Native*.

Aspidiotus lataniæ, Sign., 1869, was found on an unknown plant in the greenhouse of the Harvard botanical garden, Cambridge, Mass. *Introduced*.

Diaspis carueli, Targ., 1868. Very abundant on *Juniperus sphaerica* at Fort Hills, Mass. Coll. S. Henshaw and by the writer on *Thuja occidentalis* at the Boston public gardens, and was previously found by Mr. J. G. Jack at Jamaica Plain, Mass., on *Juniperus sphaerica*. *Introduced*.

Diaspis minima, Targ., was found on *Biota (Thuja) orientalis* in the Harvard botanical garden, Cambridge, Mass. The tree is a native of China, and the scale is new to North America. *Introduced*.

Diaspis cacti, Comst., 1883. This has been found on the plants in the greenhouse of the Agricultural College at Amherst, Mass. Probably *introduced*.

Chionaspis corni, Cooley, 1899. Found at Reading, Mass., on *Cornus paniculata* and *C. alternifolia*. Probably *native*.

Chionaspis salicis-nigræ, Walsh, 1867. A common species found at Huntington, Bedford, Malden and Lawrence, Mass. Its food-plant is

various, and seems to be a general feeder, commonly found on willow, cottonwood, dogwood and shadbush. *Native.*

Chionaspis Americana, Jhn., 1896. This is found on elm at Amherst and Springfield, Mass. *Native.*

Chionaspis ortholobis, Comst., 1881. Dr. Dimmock has found this at Springfield, Mass., on poplar and butternut. *Native.*

Hemichionaspis aspidistræ, Sign., 1869. This was found in destructive numbers on a fern (*Davallia Moorei*) in the Harvard botanical greenhouse at Cambridge, Mass. *Introduced.*

Ischnaspis longirostris, Sign., 1882. Found by Mr. Samuel Henshaw in a greenhouse at Boston, Mass., on *Monstera*, sp. *Introduced.*

Parlatoria Pergandei, var. *camelliæ*, Comst., 1883, was found by Mr. J. W. Folsom at the Harvard botanical gardens, Cambridge, Mass., and communicated to Mr. Cockerell. *Introduced.*

Bibliography.

Cockerell, T. D. A., 1899, Journal New York Ent. Soc., Vol. 7, p. 258, gives descriptive notes on *Aspidiotus Forbesi*, Johnson, found on *Acer pseudoplatanus* at Reading, Mass. Coll. Kirkland, Feb. 24, 1898.

Cockerell, T. D. A., 1899. Science N. S., Vol. 10, July, No. 238, p. 86-88. A reply is given to Mr. Marlatt's "Some sources of error in recent work on *Coccidæ*."

Cockerell, T. D. A., 1900, Psyche, Vol. 9, p. 44, gives a table for the determination of all the known North American species of the genus *Kermes*. (Since published three other species have been described.)

Cooley, R. A., 1899. Special Bulletin Mass. Agr. Coll., Aug. 10, 1899. The Coccid Genus *Chionaspis* and *Hemichionaspis*, *Chionaspis corni*, *C. salicis-nigra*, *C. pinifolii*, *C. furfurus* and *C. Americana* are cited from Mass.

Howard, L. O., 1889. Insect Life, Vol. 2, p. 34. A new imported elm insect, *Gossyparia ulmi*, is described. Localities, food-plants are given and cited as found at Cambridge, Mass., by Mr. J. G. Jack, in 1897.

Howard, L. O., 1892. Insect Life, Vol. 5, p. 51. *Gossyparia ulmi* is again found at Malden, Mass., by Mr. C. H. Rowe.

Howard, L. O., 1895. Insect Life, Vol. 7, p. 360. A new locality for the juniper scale at Jamaica Plain, found by Mr. J. G. Jack. (The above three quotations were overlooked in my first list.)

King, G. B., 1899. Psyche, Vol. 8, p. 417. *Pulvinaria Cockerelli*, n. sp., is described, found at Methuen and Andover, Mass.

King, G. B., 1900, CANADIAN ENT., Vol. 32, p. 9, gives the bibliography of the Mass. *Coccidæ* up to Aug., 1899.

King, G. B., 1900. CANADIAN ENT., Vol. 32, p. 214. The *Coccidæ* of the ivy, eleven species are cited, several of which were found in Mass.

King, G. B., 1900. Psyche, Vol. 9, p. 78, 84. The genus *Kermes* of North America, 15 species are cited and tables given; two new species are described by Prof. Cockerell and King. (Since the above paper appeared there has been one other new species described by Prof. Bogue.)

King, G. B., 1900. Psyche, Vol. 9, p. 116-118. Miscellaneous notes on *Coccidæ* from Western Mass., 22 species are cited found by Dr. Dimmock.

King, G. B., 1901. Psyche, Vol. 9, p. 153. The *Coccidæ* of the Harvard botanical gardens, 19 species are listed, with notes on the species.

King, G. B., 1901. Entomological News, Vol. 12, p. 50. *Lecanium caryæ*, Fitch. The species are described, with notes on localities and food-plants.

King, G. B., 1901. CANADIAN ENT., Vol. 33, p. 106-109. *Lecanium Websteri*, n. sp., with notes on allied forms and table to separate the species. *Lec. Kansasense* and *L. Websteri* are also found in Mass.

Additional Check List.

<i>Dactylopius nipæ</i> , Mask.	<i>Pulvinaria</i> Cockerelli, King.
<i>Kermes Pettiti</i> , Ehrh.	“ <i>acericola</i> , W. & R.
“ <i>Andrei</i> , King.	“ <i>phaia</i> , Lull.
“ <i>Perryi</i> , King.	<i>Aspidiotus abietis</i> , Schr.
<i>Lecanium lauri</i> , Boisd.	“ <i>rapax</i> , Comst.
“ <i>longulum</i> , Dougl.	“ <i>Britannicus</i> , Newst.
“ <i>melaleucæ</i> , Mask.	“ <i>juglans-regiæ</i> , Comst.
<i>Eulecanium cerasifex</i> , Fitch.	“ <i>lataniæ</i> , Sign.
“ <i>quercitrionis</i> , Fitch.	<i>Diaspis carueli</i> , Targ.
“ <i>armeniacum</i> , Craw.	“ <i>minima</i> , Targ.
“ <i>tulipifæræ</i> , Cook.	<i>Diaspis cacti</i> , var. <i>calyptroides</i> , Costa.
“ <i>pruinsum</i> , Coquil.	<i>Parlatoria proteus</i> , var. <i>Pergandei</i> , Comst.
“ <i>pyri</i> , Schr.	
“ <i>Kansasense</i> , Hunter.	<i>Chionaspis corni</i> , Cooley.
“ <i>Websteri</i> , Ckll. & King.	“ <i>salicis-nigræ</i> , Walsh.
	“ <i>Americana</i> , Jhns.
	<i>Hemichionaspis aspidistræ</i> , Sign.
	<i>Ischnaspis longirostri</i> , Sign.
	<i>Saissetia oleæ</i> , Bern.
	“ sp.

THE ECOLOGY OF INSECT SOUNDS.

BY FRANK E. LUTZ, UNIVERSITY OF CHICAGO.

"Ecology," as it is coming to be universally considered, is the science of cause. It is constantly asking "Why?" and not until we can answer "because," have we solved a problem in Ecology. It is the capping stone of the other branches of biological investigation. Morphology describes an organ or character; physiology shows us how it works and what it does; ecology, building on these, tells how and why the character or organ arose. It, then, must be considered as more than the old Natural History. Although the value of the latter cannot be overestimated, more must sooner or later be done.

This is well illustrated in the case of insect sounds. No biological subject has been more written about in popular publications—prose and poetry alike being noisy with references to the insect musicians. A large amount of strictly scientific work has also been done, and while there is much still to do, we, nevertheless, have a fairly clear idea of the anatomy of sound-producing organs, their taxonomic distribution (1), the methods of using them, some of the influences of external conditions (2), and many hypotheses as to functions of the sounds. But we know comparatively little as to why a cricket, for instance, stridulates with his wings, while a beetle rasps with his abdomen, or a cicada possesses such a complicated musical apparatus.

The translation (3) of J. Portchinsky's ('86) paper in *Hortæ Societatis Entomologicæ Rossicæ*, Vol. XX., pp. 111-127, has, however, suggested a fruitful line of investigation. Considering the Orthoptera, he calls attention to the fact that the Acrididæ—unlike their relatives, the crickets and the long-horned grasshoppers—do not stridulate with their wings, but rub "the femur against the raised meshwork of veinlets upon the tegmina." Another striking difference between this family and the other families of the order is that here, alone, we get the bright colouring of the inner surface of the hind legs. These are often the only bright colours the insect possesses. It has become an axiom that insects are constantly endeavouring to show their beauty—especially if it be a secondary char-

(1) Swinton, *Insect Variety*.

(2) Dolbear, A. E., *Amer. Natur.*, Vol. XI., No. 371, pp. 970-971. Riley, C. V., *Proc. Amer. Assoc. Adv. Science*, XXXIV., 1885, pp. 330-332. Scudder, S. H., *Proc. Bost. Soc. Nat. Hist.*, Vol. XI., 1868, pp. 306-313 and 316.

(3) *Ent. Record and Journal of Var.* (1901), Vol. XIII., No. 9.

acter, as grasshopper colours often are—and in the case of the Acrididæ this can only be done by twisting their hind legs about. Such a motion would necessarily result in friction between the femur and the tegmina, friction in irritation and increased growth, and this growth is the sound organ.

An interesting analogy which he does not mention is found in the subfamily, CEdipodinæ. Luggler (4), in describing the CEdipodinæ, said: "The insects belonging here are mostly large and showy, often possessing bright-red, yellow or even blue wings, with black bands. Nearly all the bright-coloured locusts found in the United States belong to this subfamily; most of them are very conspicuous objects in flight, when they show their colour, which is at other times entirely hidden. CEdipodinæ are also very noticeable on account of the rattling noise which the males of most species produce in flight." The connection here between sound and something to be called attention to is quite marked, and while it is about as hard to tell which came first—colour or sound—as it is in the proverbial case of hen or egg, doubtless Portchinsky would say that the sound was originally caused by the vigorous beating of the insect's wings in its amorous display, and is as much a secondary matter as the femora-tegmina stridulation.

We know that under sexual excitement many insects constantly vibrate their wings, expanding and contracting them, and swell their body to its fullest extent. It is easy to suppose that formerly male crickets, having no bright colours to display, made the most of such motions, elevated their tegmina and nervously vibrated them. The tegmina of the two sides would necessarily rub together, and the result would be the same as in the case of the Acrididæ, except for the position of the organs. Of course, if sounds are of any value at all in sexual selection, better sounds are of more value, and so these males, possessing wings well fitted for producing a noise, would win and transmit their exceptional characters. The same applies to the Locustidæ.

But passing to the other groups, we find that sounds are not always concerned with love-making. In a recent journal (5) Babb has described the stridulation of *Passalus cornutus*. In this case the abdomen is raised, rubbing against the wings when the insects are disturbed. Both males and females stridulate, and he was "led to the conclusion that it is evidence of the insect's displeasure at being disturbed, and not a sexual

(4) Third annual report of the Entomologist of the University of Minnesota.

(5) Entomological News, Vol. XII., No. 9, Nov., 1901.

call." Now, it is a common trick among insects to raise the abdomen when disturbed, and if any structures are in the way they will be rubbed, and the insect will make a noise whether he wants to or not. Such rubbings, in time, bring about physiological changes resulting in "organs." These organs are simply modified hairs, and the position of such modifications depends on the parts rubbed; in this case, the abdomen and the parts of the wings next to it.

If some often-repeated motion rubs together the pro- and meso-notum (e. g., in *Cerambycidae*), a rasping organ will appear there; if it be the pro- and meso-sternum (*Omaloplia brunnea*), or the elytra and the abdomen (*Elaphrus*), or the hind wings and the elytra (*Pelobius Hermannii*), we will find rasping organs there, as long as the physiological law holds that irritation produces excessive growth. Why this law is true is a physiological question. When this motion is made as a result of fear, anger, sociability or love, it will be sure to express fear, anger, sociability or love, as the case may be.

If we may be allowed to thus expand the idea presented so neatly by Portchinsky, the logical conclusion is that many or most insect sounds are the necessary concomitants of certain motions, not the object of the motions; and that the sound organs are callouses or growths caused by the friction, possibly perfected by natural selection.

SUPPLEMENTARY NOTE ON BURTIA.

BY A. RADCLIFFE GROTE, HILDESHEIM, GERMANY.

In reference to my remarks on the genus *Burtia*, published in the CAN. ENT. for Dec., 1901, I have received the following communication:

MY DEAR SIR,—Re *Burtia* vs. *Gundlachia*, the latter name is the property of a genus of Mollusca. In a paper on the nomenclature of some Hymenoptera, in the "*Entomologist*" a few years ago, I explained this very matter. There is a citation of it under Lepidoptera in Zoological Record, so it should have been easy to find it. Yours,

THEO. D. A. COCKERELL.

This efficiently settles the matter. The Cuban genus of Lepidoptera must be known as *BURTIA*, Grote, July, 1866. The two species are *B. rubella*, Grote, and *B. coneuta*. H.-S. Sir Geo. Hampson having also distinguished the two genera, *Burtia* (*Gundlachia*) and *Didasys*, the reference in the Philadelphia List is incorrect.

SOME NEW PARASITIC HYMENOPTERA.

BY H. L. VIERECK, PHILADELPHIA.

Hammaniella relativa, n. sp. — Face and dorsum subopaque, punctured, front opaque, the pleura more shining, longitudinal raised line on metapleura distinct, terminated abruptly, the mesothorax not appearing sharply truncate. The longitudinal medial lines on metanotum converging.

♂.—Length 14 mm. Clypeus with a few punctures, somewhat shining, transversely impressed, anteriorly though not strongly. Face closely punctured, front opaque. Cheeks impunctate on the eye margin, otherwise with distinct, small, separated punctures, shining malar space punctured, opaque. Dorsulum almost opaque, the punctures tolerably small, closely arranged. The scutellum more strongly punctured. Mesopleura shining, with well separated, to smaller closer punctures. Metanotum with converging, crude, longitudinal medial carinæ becoming obsolete before the apical margin, transverse carina strong. Metapleura separated from the metanotum by a distinct raised line, which stands out prominently, being margined on each side by a more or less distinct channel. Wings subhyaline, with a dullish cast. Areolet imperfectly trapezoidal in form, the petiole shorter than any of its sides, one-half of the curved and longest side of the areolet, one-half of the second recurrent nervure and a short distance of cubito-discoïdal nervure, hyaline; stigma and nervures almost uniformly light brown, base of the wings yellow. First dorsal segment strongly punctured, the spiracles distinctly produced, the succeeding dorsal segments becoming less and less punctured, to almost smooth.

Black: face, clypeus and mandibles excepting apex, four anterior femora, tibiæ and tarsi, a pointed mark on anterior part of the dorsum, two dots on scutellum, extreme base and apex of posterior femora and the posterior tibiæ excepting apex, ochraceous. Tegulæ, one spot aside and below them, coxæ and trochanters of four anterior legs, part of posterior coxæ and trochanters, yellow. On the posterior legs the greater part of femora, apex of tibiæ and all of tarsi are more or less dark brown. Apex of first dorsal segment somewhat claret-brown, the second, third, fourth and greater part of fifth mostly ferruginous.

Type: Coll. Am. Ent. Soc., Phila.

Type locality, New Jersey.

Two males; the co-type from Massachusetts, has a length of 12 mm.

The Massachusetts specimen was cited under the description of *Lampronota varia*, Cress. (Trans. Am. Ent. Soc., III., 164, ♂), as a variety. *Varia*, however, is a quite constant species, a series of twelve specimens showing no great extremes either in sculpture or coloration. The metathorax of *H. relativa* is very distinct from that in *varia*, which lacks longitudinal lines, and is more finely and uniformly sculptured otherwise. The yellowish cast of the wings and yellowish abdominal ornamentation is also characteristic of *varia*, and offers a good superficial difference for separating these two species.

Nadia apalachia, n. sp.—Head and thorax more or less finely and closely punctured. Mandibles heavy and incurved. Abdomen finely sculptured. Areolet sessile.

♂.—Length 10.5 mm. Clypeus with a few strong punctures, elevated transversely. Face closely, indistinctly punctured, opaque, front also opaque, punctures well separated. Cheeks somewhat shining, minutely sculptured and with sparse punctures. Mandibles heavy, incurved rather strongly. Flagellum thirty-four jointed. The superior half of propleura distinctly punctured, somewhat shining, the inferior half obscurely sculptured, opaque. Punctures of dorsum very close anteriorly, more separated posteriorly, from opaque to faintly shining. Scutellum arched, somewhat impressed on each side, closely punctured. Mesopleura with an abbreviated longitudinal raised line anteriorly, not so distinct, the integument punctured somewhat like dorsulum, the punctures closer and finer below than above. Metathorax gently rounded, almost uniformly, very closely punctured. The division between the metanotum and metapleura only indicated by a very faint impression. Wings hyaline, with a faint yellowish cast. The first and second transverse cubiti uniting on the radius, forming an acute angle. Stigma and nervures almost uniformly light brown. First dorsal segment opaque, with fine, close punctures, the spiracles not strongly protuberant, the remaining dorsal segments more finely sculptured, the apical ones becoming shining. Almost uniformly pubescent, abdomen sericeous. Black: mandibles except base and apex, clypeus, face, part of the scape, a pointed mark on anterior margin of dorsulum, base of the wings, tegulae, a spot aside and below, a spot on scutellum, four anterior legs more or less, apex of posterior coxae, apex of femora, the tibia excepting apex (more or less), and tarsi yellow. Part of posterior

trochanters and greater part of femora deep brown. Flagellum, apex of first and all of second, third and fourth dorsal segments, ferruginous.

Type: Coll. Am. Ent. Soc., Phila.

Type locality, Connecticut.

Two male specimens; in the co-type there is a transverse, median black belt on the second dorsal segment.

Cidaphurus Cressonii, n. sp.—Head and thorax opaque, spine on scutellum rudimentary. Wings subfuscous. Colour pattern much like in *Cidaphurus superbus*.

♀.—Length 13.5 mm. Clypeus moderately emarginate, slightly impressed medially, sparsely punctured. Face indistinctly sculptured, punctures separated and distinct on a longitudinal median line, to the sides indistinct, and forming faint ripples. Cheeks more shining and with sparse minute punctures. First joint of the flagellum about as long as the following two united. Dorsulum closely punctured, the punctures closer and finer posteriorly, a somewhat shining line extending from the anterior border to the middle, medially. Mesopleura with regular separated punctures. Scutellum shining, closely punctured, spine rudimentary. Metanotum coriaceous. Superior posterior angle margined laterally. Metapleura closely punctured, somewhat shining. Median and marginal cells subfuscous, the rest of the cells paler. Stigma and costal nervure pale, the other nervures brown, second cubitus basally and first and second recurrent nervures apically interrupted by a transparent space, first and second cubitus uniting on the radial nervure, second recurrent nervure received by the areolet before the middle. Abdomen shining, polished apically, first segment closely punctured, the punctuation of succeeding segments sparser. Head yellow; malar space, a line from clypeus to insertion of antennæ, and branching out behind insertion, a line on vertex from eye to eye, and occiput, black or nearly so; scape behind and flagellum dark brown. Anterior and posterior margins of prothorax, a loop on each side of dorsulum, tegulæ, a line below, nearly one-half of mesopleura, scutellum, greater part of metathorax, apical border on first, second, third and greater part of remaining dorsal abdominal segments, greater part of four anterior legs, apical trochanter, and basal half of tibiæ in posterior legs, more or less yellow. A broad median belt extending more than half way back on dorsulum from the anterior margin, mesopleura posteriorly and metanotum anteriorly, and base of first dorsal abdominal segment, black.

Related to *Cidaphurus superbus*, Cress.

Type: Coll. Am. Ent. Soc.

Type locality, Massachusetts.

One female specimen. I take pleasure in naming this fine species after Mr. E. T. Cresson.

AN ABERRATION OF ACTIAS LUNA.

BY A. RADCLIFFE GROTE, HILDESHEIM, GERMANY.

My friends have not always forgotten me, but have occasionally sent me live Saturnian chrysalids, spun up no doubt with the intention of the insect to emerge in America. Instead, the poor deluded creatures appeared as moths in my German room, allowing me to deceive myself for the moment that I was at home. *Cynthia*, *promethea*, *cecropia*, *polyphemus*, *io* and even *imperialis*, came out just as in America. The only difficulty I had was with my few cocoons of *luna*, the moths in some cases failing to expand their wings. But, if my memory does not fail, this accident happens also more especially with *luna* in the breeding cage at home. Among the examples which emerged here is one small male, expanding 78 mil., which is the most curious example of the species I remember to have seen. The wings are almost perfectly expanded, a little unevenness of the costa of the right primary, which is somewhat concave, and a slight crumpling of the costal region of both secondaries, are traces of retarded development; the "tails" are fully out. The eye spot on the left primary is interlined with red, and the spot itself is connected by a reddish-purple bar with the purple costal margin. On the right primary the suffusion of the eye spot with purple is entire, and a wider reddish-purple bar fuses it with the costal band. This bar is finely edged with black outwardly and gives the appearance of the eye spot being distorted. On the outer margins the reddish terminal band is very distinct (var. *dictynna*). But the most curious feature is the appearance over the eye spot of the right secondary (the wings on the right side are the more abnormal) of a straight purple bar, intersecting the eye spot over the middle and projecting somewhat before and behind it. The eye spot on the left secondary is normal, and there is no other apparent deviation, except that on the under surface all the four eye spots are suffused with reddish-purple. There are some blackish discolorations on the hind wings, accidentally caused, I think, by body fluids.

I have exhibited the specimen at Frankfort and at other entomological meetings here, but the species not being well known, it excited but a passing interest. I would have sent the specimen to America, but hope to live to bring it myself.

NOTES ON THE MOUTH-PARTS OF BOMBUS.

BY T. D. A. COCKERELL AND JOHN M'NARY, E. LAS VEGAS, N. M.

We have lately studied the mouth-parts of a number of species of *Bombus*, both American and European, and adding our results to those obtained by Radoszkowski (1877) we find as follows :—

(1) Taking the first joint of the labial palpus of the ♀ as an index of the length of the mouth-parts (it is especially convenient for accurate measurement), we find that the longest-mouthed species is *B. Gerstackeri*, from the European Alps (our examples were collected by Friese at Engelberg), a species known to be the exclusive visitor of *Aconitum lycoctonum* in that region. The *Aconitum* (Knuth, Blütenbiologie, Vol. II., p. 53, fig. 20) has the hood enormously produced, and is adapted only to bees with extremely long tongues.

(2) No Rocky Mountain or other American *Bombus* examined by us has nearly such long palpi (or tongue) as *B. Gerstackeri*, nor have we such an Aconite as *A. lycoctonum*. Our longest-tongued type seems to be *B. Nevadensis*, which visits *Delphinium*.

(3) The species with shortest mouths are mostly high-alpine or arctic: *proximus*, *melanopygus*, *lapponicus*, *viduus*. *B. terrestris* also ranks with these as one of the shortest-mouthed; it is remarkable that the species which superficially looks exactly like *B. terrestris*, namely, *B. hortorum*, is one of the longest-mouthed of all, having the first joint of labial palpus about $6\frac{1}{2}$ mm. long. We have both *terrestris* and *hortorum* from Innsbruck, collected by Friese.

(4) *B. ligusticus*, *runderatus* and *ussurensis* rank with the longest-mouthed species, and probably, like *Gerstackeri* and *hortorum*, are adapted to *Aconitum*.

(5) The commonest length for the first joint of the labial palpi is from 4 to $4\frac{1}{2}$ mm. Here come *B. juxta*, *Morrisoni*, *rajellus*, *muscorum*, *senilis*, *fragrans*, *equestris*, *sylvarum*, *Stewenii*, *Latreillelulus*, *Mlocosewiczii*, *calidus*. The American *virginicus* and *Kincaidii* fall short of this by a small amount, although they are large bees.

(6) The second joint of the labial palpi does not usually enlarge in proportion to the first, hence the longest-mouthed species have the greatest difference between the joints. In such species as *runderatus*, *ussurensis*, etc., the first joint is from $5\frac{1}{2}$ to 6 times as long as the second. In nearly half the species, the first joint is from 4 to $4\frac{1}{2}$ times as long as the second; in *proximus* it is only $2\frac{1}{2}$ to 3 times as long. In *Gerstackeri* the

second joint has lengthened in proportion to the first, so that the average proportions are preserved, although the palpi are extremely long. In *B. sonorus* the first joint is relatively short (about as long as in *pratensis*, *hypnorum*, etc.), but it is nevertheless over $4\frac{1}{2}$ times as long as the second.

(7) It seems probable that the only oligotrophic bumble-bees are those with extremely long tongues, adapted to certain species of aconite. The American species probably all visit miscellaneous flowers, and this must be especially true of the Arctic species, which have nearly a monopoly (so far as bees are concerned) of the flowers of their region. Thus, *B. Kincaidii* is the only bee on the Pribiloff Islands, where brightly-coloured flowers abound.

NOTE ON *PITYOPHTHORUS CONIPERDA*, SCHWARZ.

BY W. HAGUE HARRINGTON, OTTAWA.

This species was described in the Proceedings of the Entomological Society of Washington, Vol. III., p. 144, 1895, and the author stated: "I offer herewith a description of this species, being solely tempted thereto by the interest attached to its life-history; for, as far as I am aware, there is no other Scolytid known which normally develops within the cones of pine trees." Possibly since that time a similar habit may have been observed in regard to other members of the Scolytidæ, but I cannot recall any reference to such observations. The beetle in question was first collected by me on May 24, 1884, and its capture was quite accidental. Mr. Fletcher and myself had that day visited a grove of white pines on the Gatineau, a few miles north of Ottawa, with the special object of collecting the somewhat rare little butterfly, *Thecla Nippon*, of which we succeeded in capturing several good specimens. Having climbed up into one of the pine trees, to try and net a butterfly which had settled up aloft, I noticed that the young buds at the tips of the twigs were injured by some insect. Investigation showed that one of the bark-boring beetles was at work, and a few specimens were collected. These were determined for me as *Dryocates affaber*, and were referred to by me under that name in notes on Canadian Rhynchophora in the CANADIAN ENTOMOLOGIST, 1891, Vol. XXIII., p. 26. At Aylmer, Que., about eight miles above the city, on the Ottawa River, on June 25, 1887, while seeking, with my friend Fletcher, upon red pines for *Podapion gallicola*, we found the shoots and cones seriously infested by a Scolytid, which appeared

slightly larger, but which proved to be the same species. The infested cones were shrivelled and hard, and their development was entirely arrested. The following year similar observations were made in the same locality, and similar infestations were noted in subsequent seasons. On May 26, 1901, I examined some white pines not far from the locality where the beetle had been first noticed in 1884, and found that there was a serious infestation of the cones. The ground beneath the trees was strewn with aborted and undeveloped cones, which were compact and hard, about three inches in length, but only one-half inch in diameter. On breaking open any one of these, *P. coniperda* was apparent and its burrows running through the resinous compacted scales. In one cone I observed a small bright Chalcid, but, unfortunately, it dropped in the grass and was lost, much to my regret, for it was evidently a parasite of the beetle. With the hope of obtaining specimens of the Hymenopteron, I took home some of the cones, but no flies appeared. After it was apparent that there was no probability of any insects emerging, I broke up the cones, which was not an easy matter, owing to their hard, resinous condition, but could find no trace of any of the parasites. Some beetles were obtained (all dead), but many of them were broken in digging them out of their burrows or in tearing apart the cones. As was mentioned in my former note on this species, the beetles remain continually in the cones; none of them emerged of their own accord. While other members of our Scolytidæ may be found flying about, some species in great abundance, I have never met with this species at large, although it must be fairly abundant and widely distributed. Probably on account of this habit of concealment, it does not fall a frequent prey to our collectors, as I have not found it in collections sent to me for examination. That excellent entomologist, the late Dr. John Hamilton, with whom I had the privilege of corresponding for several years, obtained the species at Sparrow Lake, Ont., and published an interesting note upon it in CANADIAN ENTOMOLOGIST, 1893, Vol. XXV., p. 279. The species is not so destructive as many others of the Scolytids, but apart from its arresting the growth of the cones and the development of the seeds, it causes a certain amount of injury by its infestation of the young shoots. Schwarz records it from Michigan, Virginia, New York and Pennsylvania, proving that its range is an extensive one. I may add that my only specimens of true *Dryocates affaber* (determined by Dr. Hopkins) occurred upon spruce.

LARVA OF DATANA, UNKNOWN SPECIES.

During my last week of collecting in the Huachuca Mts., Cochise Co., Arizona, I found, Aug. 11th, 1899, eighteen *Datana* larvæ on a Manzanita bush (*Arctostaphylos glauca*) or Western bearleaf. This larva was not known to me, and therefore I was anxious to send it to the artist who made the figures for Prof. A. T. Packard's "Bombycine Moths." To all appearance the larvæ were nearly full-grown, and I had a negative taken of them by an ornithologist camping near by, so as to have a memento left in case they should transform before reaching their destination. Cloudy weather and drizzling rain late in the day made it difficult to obtain a good picture. I had to mail the insects early the next morning from Fort Huachuca, which is 12 miles from Ramsey Canyon, and further delay was hazardous. I took a hasty description of the larva, then boxed two of them in a tin canister for Mr. L. H. Joutel, the artist, care of American Museum of Natural History of New York City. But, unfortunately, these larvæ, although received, were never turned over to the artist, whose address I could not find in my notebook. The other sixteen larvæ I sent to Mr. Chas. Palm, then rustivating in Sullivan Co., N. Y., with a view to having these raised on some eastern food-plant. The larvæ refused everything offered, and finally Mr. Palm set them at liberty in the bush, trusting that some might transform there.

Description of larva: Body black, with longitudinal yellow lines, of which three are subdorsal on each side of a broad, black dorsal band, and one sub-spiracular yellow line; another broad, black band between the last subdorsal and spiracular line, of nearly the same width as that on the dorsum. A yellow, central abdominal line from the first to twelfth segment. Head and anal plate pitchy black and smooth. Abdominal protuberance at the base of black legs of a purplish-pink colour. Spiracles black, enclosed by a circular silvery line. All true and abdominal legs pitchy black. Mouth-parts purplish-pink. Long white hairs from 5 to 8 mm. long all over the body, except dorsal black band, on which the hairs were shorter and more scattered.

Length of larva, 35 mm., and width, 5 mm. When at rest the larvæ assumed the usual curved posture, the anterior and posterior three segments well thrown up.

R. E. KUNZE, Phoenix, Arizona.

A NEW GALL-MAKING COCCID.

BY T. D. A. COCKERELL, EAST LAS VEGAS, N. MEX.

Cryptophyllaspis Rübsaameni, n. sp.—♀. Orange, oblong, caudal end sunken, overlapped at the sides by lobiform projections; no circumgenital glands; anal orifice broad-oval, about $17\ \mu$ long, and distant about $39\ \mu$ from the bases of the median lobes; lobes and squames formed just as in *C. occultus* and of the general type of *Aspidiotus cyanophylli*; three pairs of lobes, not even the median ones darkened in the least; median lobes slightly notched on each side; squames narrow and pointed, strongly fringed; beyond the third lobe are three double squames, each having the appearance of two squames united at the base; interlobular incisions with thickened edges, of the *Diaspidiotus* type; two rows of dorsal glands, not very numerous, on each side of the caudal end; spines small.

Galls small, subcylindrical, about 2 mm. long, thickly clustered on leaves of *Codiaum*.

Hab.—Bismarck Archipelago; communicated by Mr. E. H. Rübsaamen. Types in Coll. N. M. Agric. Exp. Sta. and U. S. Dept. Agriculture.

NOTES ON MR. LYMAN'S PAPERS.

BY A. RADCLIFFE GROTE, HILDESHEIM, GERMANY.

I was much interested by Mr. Lyman's careful paper on a species of *Gortyna*, boring in burdock. If *aerata*, Lyman, is a good American species it should have an alternative food plant, since the burdock is imported from Europe. From Mr. Lyman's detailed statements, the distinction from *necopina* is assured. The differentiation from *nitela* is not so clearly given.

With regard to *nitela*, Mr. Lyman is quite correct, that Guenée first describes *nebris* and then *nitela*; and in my catalogue of 1874 I give the two as distinct species in the above order of their description. But in my Buffalo Check List of 1875 I place *nitela* first; and in 1882 I retain this sequence and record *nebris* as a variety of *nitela*. But I am not agreed with Mr. Lyman that *nebris*, the white-spotted type, represents the original form of the species. I think the white filling in of the ordinary spots a specialization, therefore a variation from the original form of the species. The normal Gortynid ornamentation is probably that shown by

inquasita, *necopina* and *nitela*. This appears to me a reasonable view when we consider the markings of the Noctuids as a whole.

It is a delicate question whether we should prefer the name given to the variety, when described on the same page as the species, merely because it stands first. I do not think it subserves the practical ends of science. For instance, I prefer the name *Orthosia ferrugineoides* for our common species, and record *bicolorago* as designating the aberration, although the latter stands first in Guenée. It is pushing priority beyond what the law intends. But if *nebris* and *bicolorago* were first described by another author and in another book, their priority for the species would be undoubted.

I was also much interested by Mr. Lyman's paper in the January number. In the Annals of the N. Y. Lyceum N. Hist., Vol. VIII., 1866, will be found a paper by Grote and Robinson, Lepidopterological Contributions, with three coloured plates, in which we originally drew attention to Abbot's figuring two species on Plate 78 of the Insects of Georgia. We then gave the following synonymy on page 374, *l. c.*:

(1) *Lophodonta georgica*.

Phalena angulosa, Ins. Ga., 78 [83], ♂, upper left-hand figure (1797).

Notodonta georgica, H.-S., Ex. Lep. 384, ♀ (1855).

(2) *Lophodonta angulosa*.

Phalena angulosa, Ins. Ga., 78 [83], ♀?, lower right-hand figure (1797).

Lophodonta angulosa, Packard, P. E. S. P., 358 (1864).

It is not certain that the lower right-hand figure represents a female. We gave particulars which render it possible that this figure also represents the male sex. The name *angulosa* became restricted to this species by Herrich-Schäffer's description of *georgica*.

CHANGES IN ENTOMOLOGICAL FAUNA OF NORTHERN ILLINOIS.

BY F. M. WEBSTER, WOOSTER, OHIO.

Among the ways I find that one can study the changes in the insect fauna of a locality as years go on is to occasionally go back to some such section where one has years ago been familiar with the insects to be found there and note the number of newcomers or, possibly, the passing of some of the old ones, though these last are by far the less numerous of the two.

Recently, while on a visit to my old home in De Kalb county, Northern Illinois, the insects of which I was pretty well acquainted with twenty years ago, but with which I have known little since that time, I was most unexpectedly met with complaints of the Buffalo Carpet beetle, *Anthrenus scrophulariae*, unheard of there until within a few years, and which I never captured there myself.

Another newcomer was the Box Elder bug, *Leptocoris trivittata*, which I encountered in February, crawling and flying about my room, which had not been kept heated during the winter. This last was not so much of a surprise, as Dr. Forbes, whose monumental works on the insects of Illinois will stand as long as applied entomology itself, told me last fall that it had then nearly or quite crossed the State from west to east. But the thing did certainly look out of place to me where I found it.

Of the old-time injurious species, such as occurred there thirty or forty years ago, there is not one that does not occur there now, though not always in such numbers. The Chinch bug, *Blissus leucopterus*, that I remember back in the fifties, is not as destructive as of old, on account, I believe, of the fact that all uncultivated grounds are now generally pastured during summer, leaving no protection for the bugs during winter.

In most cases great diminution in numbers is most conspicuous among such species as fed on the natural vegetation, and as the land has been underdrained and brought into cultivation, these have disappeared with their food-plants. Thus, *Saperda mutica* and *Plectrodera scalator* have gone the way of the willows upon which they subsisted. *Acmeodera pulchella*, formerly always common on the blossoms of *Rudbeckia hirta*, has become far less so, as the plant has succumbed to the cultivation or pasturing of the land where once they grew abundantly.

The busy, economic entomologist has far too little time to watch these things closely, but it would seem that there was here a field for such as are able to withdraw from the hurry and push of professional work, and quietly and carefully watch these comings and goings mid the insect world, for other States than Illinois offer equally desirable fields for such observations. Not only this, but we not infrequently hear complaints from those who follow some line of business and study insects only as a pastime, that they have no opportunity to collect outside their own narrow field, whereas, here is a phase of entomological study that is really suffering for just such labour as these circumscribed people can best give to it. The data obtained

in this manner are something more than mere gossip, as, if accurately observed and recorded where they are accessible to the busy man, these notes will sooner or later prove invaluable in the study of insect diffusion and disappearance.

BOOK NOTICE.

INSECTS INJURIOUS TO STAPLE CROPS.—By E. Dwight Sanderson, B. S. Agr., Entomologist, Delaware College Agricultural Experiment Station. New York: John Wiley & Sons. (Price \$1.50.)

This is a very satisfactory compilation of the information to be obtained from the publications of State Agricultural Experiment Stations and of the Division of Entomology at Washington, regarding a considerable number of insects of practical interest to farmers. The writer lays no claim to originality, but he has succeeded in preparing a useful book, full of information of a trustworthy character, arranged in a convenient manner, and sufficiently illustrated. Some of the photogravures, however, are by no means as clear as one would wish. The book is intended for the use of farmers, and aims at giving them a correct knowledge of the insects with which they may have to contend and the methods that have been found most serviceable for preventing or controlling their injuries. Whether the ordinary farmer can be induced to read and make use of a book of this kind is somewhat doubtful, but if he does it will surely repay him well for any effort he may put forth in doing so.

The work opens with a short account of some of the most startling losses caused by insects, which must give the reader a vivid idea of their importance. After a chapter on the structure and development of insects, there follows a very useful epitome of the methods of intelligent farming, which will be found effective in preventing insect injury. A chapter is devoted to beneficial insects, in order that the farmer may know friend from foe, and the greater part of the book to descriptions and life-histories, together with remedies, of insects affecting various grain crops, corn, clover, cotton, tobacco, hops, potatoes, and sugar beets. The work is completed by an account of the most useful insecticides and the formulæ for their preparation. On the whole, it is an excellent manual, and will be found a handy book for reference by all who are engaged in the practical work of fighting against insect foes.

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The Canadian Entomologist

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EDITED BY

REV. C. J. S. BETHUNE,

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EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

N. A. LEPIDOPTERA desired. Those willing to collect, in exchange for European specimens, please communicate with JAMES McDUNNOUGH, Kleist Str. 42, Berlin, Germany.

Have several recent books and pamphlets on N. Am. Hymenoptera which I would like to exchange for insects. Please write to G. CHAGNON, post-office box No. 186, Montreal, Can.

ARCTIANS.—Living eggs or larvæ of any North American moths of the genus *Artia* wanted for purposes of studying preparatory stages. Will be glad to render help, if possible, as to wants of anyone assisting. ARTHUR GIBSON, Cent. Exp. Farm, Ottawa, Can.

BASSWOOD INSECTS.—The writer is making a special study of insects injurious to basswood (Tilia). Notes on insects found feeding on this tree will be acceptable.—ARTHUR GIBSON, Cent. Exp. Farm, Ottawa, Can.

FOR EXCHANGE.—Fine papered specimens of *Thecla wittfeldii*, *Lycæna isophthalmæ*, *Heliconia charitonina*, *Oligaria maculata*, etc., for North American butterflies. in papers, in first-class condition. WALTON I. MITCHELL, 1721 Mount Vernon St., Philadelphia, Pa.

LEPIDOPTERA.—*Papilio palamedes*, *Calephalis borealis* and many others to exchange. Would like to receive lists. JOHN & HURD COMSTOCK, 1572 Ridge Ave., Evanston, Illinois.

LEPIDOPTERA.—Pupæ and imagoes of nearly all N. Am. Sphingidæ and imagoes of Arctians desired in exchange. HENRY ENGEL, P. O. Box 369, Pittsburg, Pa., U. S. A.

WANTED.—Erycinidæ of the world. Also butterflies from the Western and North-western States. Offer Diurnes from Central and South America, in faultless condition. LEVI W. MENGEL, Boys' High School, Reading, Pa.

DIPTERA.—Wanted, as many Asilina as possible from all parts of North America. Write for particulars to PROF. C. H. FERNALD, Amherst, Mass.

WANTED.—Ants and Termites. Specimens and literature for exchanges. H. WOLFF, S. J., Canisius College Museum, Buffalo, N. Y.

LEPIDOPTERA.—Fine bred specimens of *Catocala illecta* and *minuta* for exchange. Also *Nathalis iole*, *Anæa andria*, etc. Want *Catocalæ*, butterflies and sphinges. G. M. DODGE, Louisiana, Mo.

WANTED.—American silk-producing Lepidoptera. Directions for the rearing of wild silkworms can be obtained from the author. For terms, address ALFRED WAILLY, Branksome, Upper King's Road, Kingston Hill, London, Eng.

FOR EXCHANGE.—Butterflies of this neighbourhood, for those not in my collection. Have also a number of chrysalids of *Feniseca tarquinius* for exchange. Address: WILMON NEWELL, Wooster, Ohio.

ORTHOPTERA.—Wanted, specimens and literature for exchange. FRANK E. LUTZ, Zoological Bldg., University of Chicago, Chicago, Ill.

A NEARLY complete set of U. S. Agricultural Reports for exchange for some works on Entomology not in my library. Please make offer. GEORGE B. KING, Lawrence, Mass.

ACULEATE HYMENOPTERA, especially Apoidea, wanted. Will give good exchange in Coleoptera or Hymenoptera. E. S. G. TITUS, Urbana, Ill.

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No. 4

CLASSIFICATION OF THE FOSSORIAL, PREDACEOUS AND PARASITIC WASPS, OR THE SUPERFAMILY VESPOIDEA.

BY WILLIAM H. ASHMEAD, A. M., ASSISTANT CURATOR, DIVISION OF
INSECTS, U. S. NATIONAL MUSEUM.

(Paper No. 4.—Continued from Vol. XXXII., 1900, p. 296.)

SUBFAMILY III.—Aporinæ (= Pompilinae).

1815. Aporida, Leach, Edinb. Encyc. IX., p. 149.

Pompilus, Fabr., is preoccupied, and the family name *Pompilidae* must be changed to *Ceropalidae*, as has been shown recently by Fox (*vide* Ent. News, Vol. XII., 1901, p. 268). In consequence, my subfamily *Pompilinae* must be changed to *Aporinae*.

This subfamily is unquestionably the largest in number of genera and species of any of the groups of the family *Ceropalidae* (*Pompilidae*). Most of the species, in comparison with those found in the *Pepsinae*, are of medium size or small, few attaining much over an inch in length, while the vast majority are much smaller.

All of the species, so far as we know, dig burrows in the ground, in which they store up spiders as food for their young. I suspect, however, that some of the genera, judging from their structural characters and the absence of a tarsal comb, will prove to be *inquilinous in the nests of others*, as with the *Psithyridae*, *Stelididae* and other families in the Hymenoptera.

The characters made use of in my table of subfamilies readily separate the subfamily. The spiny or strongly bristly legs, which are never smooth nor serrate, and the absence of a transverse grooved line or furrow on the second ventral segment separate it from the *Pepsinae* and the *Ageniinae*; the antennæ being placed higher up on the face, and not low down on or below an imaginary line drawn from the base of the eyes,

or the non-produced clypeus, separate it from the *Planicepinæ* and from *males* in the *Ageniinae*; while from the *Notocyphinae* and the *Ceropalinae* it is separated by the hidden or only partly visible labrum, which is never very large or free, and by other characters.

The *Aporinae* may be separated into two tribes :

- Front wings with *three* cubital cells, the second and third each receiving a recurrent nervure.....Tribe I., Anopliini.
 Front wings with only *two* cubital cells, rarely with only one, the second usually receiving both recurrent nervures, rarely receiving only one—the first; head lenticular, the antennæ inserted only slightly above an imaginary line drawn from the base of the eyes.....Tribe II., Aporini.

Tribe I.—Anopliini.

Many new genera have been recognized in this tribe, and I have restored many genera suppressed by various authorities, but I believe these may all be readily separated now by the characters made use of in the following table :

Table of Genera.

- Cubitus in hind wings originating *before* the transverse median nervure, the submedian always shorter than the median.....2.
 Cubitus in hind wings not originating before the transverse median nervure, either interstitial or originating from *beyond* the transverse median nervure.
 Cubitus in hind wings *interstitial*, or very nearly, with the transverse median nervure.....10.
 Cubitus in hind wings originating beyond the transverse median nervure.....23.
 2. Metathorax posteriorly rounded, *not* impressed, and without a median impressed line or furrow above, or the impressed line very vaguely defined.....7.
 Metathorax posteriorly rather abruptly or obliquely truncate, impressed or emarginate, or *with* a more or less distinct median impressed line or furrow above; anterior tarsi in ♀ combed.
 Pronotum shorter than the mesonotum; eyes extending close to the mandibles; third cubital cell subquadrangular or trapezoidal, rarely subtriangular.....3.
 Pronotum long, as long or a little longer than the mesonotum; eyes not quite extending to base of mandibles, a linear space between; third cubital cell narrowed above or subtriangular;

submedian and median cells equal or nearly; claws in ♀ with a tooth beneath, in ♂ cleft; first joint of flagellum in ♀ not longer than the second, in ♂ shorter.....(1) *Ferreola*, Lepel.

(Type *F. algerica*, Lepel.)

3. Head viewed from in front *not* wider than long, usually a little longer than wide, the eyes *not* strongly converging above, although usually slightly converging..... 4.

Head viewed from in front *wider* than long, the eyes strongly converging above.

Claws in ♀ with a median tooth, in ♂ cleft; first joint of flagellum in ♀ longer than the second, in ♂ not longer, about equal; submedian cell in front wings a little shorter than the median.....(2) *Batozonus*, Ashm., g. nov.

(Type *Pompilus algidus*, Smith.)

4. Claws in ♀ with a median tooth beneath, in ♂ cleft.....6.
Claws cleft in both sexes.....5.

5. Clypeus in ♀ anteriorly entire; metathorax posteriorly obliquely truncate or more or less impressed; tarsal comb in ♀ long.

Wings black, fuscous or subhyaline; first joint of flagellum in both sexes elongate, longer than the second; basal joint of front tarsi *shorter* than tibia; abdomen usually marked with white.....(3) *Spilopompilus*, Ashm., g. nov.

(Type *Pompilus biguttulatus*, Fabr.)

Wings red or ferruginous, the tips black; first joint of flagellum in ♂ not longer than the second; basal joint of front tarsi longer than tibia; abdomen not marked with white, sericeous..... (4) *Paracyphonix*, Magretti.

(Type *P. metemmensis*, Magr.)

6. Clypeus and labrum with a median sinus anteriorly; pronotum with the hind margin arcuately or very obtusely angularly emarginate.

Abdomen wholly black; second joint of front tarsi less than half the length of the first.....(5) *Pompilogastra*, Ashm., g. nov.

(Type *Pompilus aethiops*, Cress.)

Abdomen with the second segment marked with red or yellow; second joint of hind tarsi fully half as long as the first.....(14) *Arachnophroctonus*, Ashm. (part).

7. Metathorax bare or nearly, at least not clothed with a silvery pubescence; claws in ♀ with a median tooth, in ♂ cleft.....8.

Metathorax clothed with a fine, usually dense, silvery pubescence; claws in ♀ cleft, in ♂ with a median tooth.

Submedian and median cells equal, the transverse median nervure interstitial with the basal nervure; third cubital cell large, trapezoidal; mandibles 2-dentate; first joint of flagellum in ♂ as long as the second (6) *Sericopompilus*, Ashm., g. nov.
(Type *Pompilus cinctipes*, Cress.)

Submedian cell a little longer than the median; third cubital cell subtriangular; mandibles 3-dentate; first joint of flagellum in ♂ short, shorter than the second (7) *Nannopompilus*, Ashm., g. nov.
(Type *N. argenteus*, Ashm., M. S.)

8. Pronotum normal and always shorter than the mesonotum 9.
Pronotum broad and as long as the mesonotum.

Submedian cell in front wings much longer than the median; third cubital cell large, not or only slightly narrowed above (8) *Hypoferreola*, Ashm., g. nov.
(Type *Ferreola cephalotes*, Sauss.)

9. Wings red or ferruginous, their tips black; third cubital cell subquadrangular or trapezoidal, never distinctly triangular; mandibles 2-dentate, the inner tooth large, acute. (9) *Epizuron*, Schiödte.
= *Cryptocheilus*, Panzer.
(Type *Pompilus rufipes*, L.)

Wings differently coloured, not red, usually fuscous or subfuscous; mandibles in ♀ 3-dentate, the inner tooth small, in ♂ 2-dentate; body marked with yellow or red (10) *Poecilopompilus*, Ashm., g. nov.
(Type *Pompilus navus*, Cress.)

10. Metathorax posteriorly rounded, *not* impressed, and *without* a distinct median longitudinal impressed line or furrow above, or this line is very vaguely defined 19.
Metathorax posteriorly truncate, impressed or emarginate, or *with* a more or less distinct median longitudinal impressed line or furrow above.

Third cubital cell triangular, subtriangular, or at least always strongly narrowed above and sometimes petiolate; claws in ♀ with a median tooth, in ♂ cleft 16.

- Third cubital cell large, trapezoidal, or at least never distinctly triangular nor petiolate..... 11.
11. Claws in ♀ with a median tooth, in ♂ cleft; metathorax posteriorly not striate..... 12.
- Claws cleft in both sexes; metathorax posteriorly striate..... (11) *Pseudoferreola*, Radoszk. (Type *P. striata*, Radosz.)
12. Transverse median nervure in front wings *interstitial* with the basal nervure, the median and submedian cells of an equal length.... 14.
- Transverse median nervure in front wings *not* interstitial with the basal nervure, the submedian cell more or less distinctly the longer..... 13.
13. Clypeus anteriorly truncate or very slightly rounded, *without* a median sinus; body black or blue-black; pronotum posteriorly obtusely angularly emarginate, first joint of flagellum in ♀ longer than the second, in ♂ not or scarcely longer than the second, but at least thrice as long as thick; tarsal comb short and sparse..... (12) *Pycnopompilus*, Ashm., g. nov. (Type *Pompilus scelestus*, Cress.)
14. Clypeus in ♀ with a median sinus, in ♂ simple, the labrum slightly exposed..... 15.
- Clypeus in both sexes truncate or slightly rounded, *without* a median sinus.
- Body black or blue-black, the abdomen partly red; first joint of flagellum very elongate, much longer than the second; posterior face of metathorax concave, the upper and lower angles obtusely dentate; third cubital cell very large, the second quadrangular..... (Siam) (13) *Tachypompilus*, Ashm., g. nov. (Type *T. Abbotti*, Ashm., M. S.)
- Head and thorax black, the abdomen towards base marked with red; posterior face of metathorax only slightly impressed; third cubital cell triangular..... (21) *Entypus*, Dahlb. (part.)
15. Abdomen red or marked with red or yellow, rarely wholly black; first joint of flagellum in ♀ elongate, longer than the second; in ♂ short, never longer than the second..... (14) *Arachnophroctonus*, Ashm., g. nov. (Type *Pompilus ferrugineus*, Say.)

16. Third cubital cell small, distinctly triangular, and either petiolate or subpetiolate, rarely elliptical 18.
 Third cubital cell larger, triangular or subtriangular, but never petiolate, the marginal cell obliquely truncately pointed at apex..... 17.
17. Transverse median nervure in front wings interstitial with or originating a little before the basal nervure; pronotum as long or nearly as long as the mesonotum.
 Pronotum with the hind margin in ♀ obtusely angularly emarginate, in ♂ arcuately emarginate; first joint of flagellum in ♀ elongate, much longer than the second, in ♂ not longer than the second..... (15) *Schiztosalius*, Sauss.
 (Type *S. Elliotii*, Sauss.)
 Pronotum with the hind margin in both sexes arcuately emarginate; first joint of flagellum in ♀ short, not longer than the second, in ♂ shorter than the second..... (16) *Sophropompilus*, Ashm., g. nov.
 (Type *Pompilus ingenuus*, Cress.)
18. Transverse median nervure in front wings *not* interstitial with the basal nervure, the submedian cell most frequently distinctly longer than the median..... 19.
 Transverse median nervure in front wings *interstitial* with the basal nervure, the submedian and median cells equal.
 Pronotum shorter than the mesonotum, with the hind margin obtusely angularly emarginate (rarely arcuate); first joint of flagellum in ♀ elongate, much longer than the second, in ♂ not longer than the second..... (17) *Pompiliodes*, Radoszk.
 (Type *P. unicolor*, Radosz.)
19. Marginal cell not elliptical, but triangularly pointed at apex; claws in ♀ with a median tooth beneath, in ♂ cleft..... 20.
 Marginal cell elliptical; claws cleft in both sexes.
 Second and third cubital cells longer than wide, narrowed above: first recurrent nervure interstitial with the second transverse cubitus, the second recurrent nervure joining the third cubital cell a little beyond the middle..... (18) *Lophopompilus Radoszkowski*.
 (Type *Pompilus grandis*, Eversm.)

*I do not know this genus; judging from the shape of the marginal cell, it may probably prove to belong to the *Pepsinæ*.

20. Third cubital cell trapezoidal or, at most, subtriangular, never distinctly triangular or petiolate; abdomen black 21.
 Third cubital cell triangular and petiolate or subpetiolate, especially in the males; abdomen more or less red basally 22.
21. Pronotum hardly shorter than the mesonotum, the hind margin arcuately emarginate; first joint of flagellum in ♀ longer than the second, in ♂ not longer than the second; tarsal comb not long (19) *Pompilius*, Ashm., g. nov.
 (Type *Pompilus cylindricus*, Cress.)
 Pronotum shorter than the mesonotum, the hind margin obtusely angularly emarginate; first joint of flagellum in ♀ very elongate, longer than the second, in ♂ about equal to the second; tarsal comb long, flexible (20) *Agenioideus*, Ashm., g. n. (part).
 (Type *Pompilus humilis*, Cress.)
22. Pronotum shorter than the mesonotum, the hind margin obtusely angularly emarginate; first joint of flagellum in ♀ elongate, very distinctly longer than the second, in ♂ not or scarcely longer than the second; abdomen usually marked with red or yellowish on basal segments (21) *Entypus* Dahlbom.
 (Type *E. ochraceus*, Dahlb.)
23. Metathorax posteriorly rounded, neither impressed nor obliquely truncate, and usually *without* a distinct median longitudinal impressed line or furrow above, the latter, if present, is very vaguely defined; pronotum rarely much lengthened 30.
 Metathorax posteriorly obliquely truncate or impressed, often concave or subconcave posteriorly; if rounded posteriorly, then the metanotum has a median longitudinal impressed line or furrow 24.
24. Front tarsi in ♀ *without* a distinct long comb, at most with a scopa of short stiff bristles beneath and a few short bristles at apex of the joints 34.
 Front tarsi in ♀ *with* a distinct, usually long comb; claws in ♀ with a median tooth beneath, in ♂ cleft (rather otherwise and then noted) 25.
25. Submedian and median cells in front wings equal, the transverse median nervure being interstitial with the median nervure 26.
 Submedian cell in front wings longer than the median 29.
26. Third cubital cell trapezoidal, usually as large or nearly as the second 28.

- Third cubital cell in front wings triangular or subtriangular, smaller than the second and sometimes petiolate..... 27.
27. Body wholly black, but more or less distinctly clothed with a silvery or sericeous pubescence; first and second joints of flagellum in both sexes equal or very nearly... (22) *Anoplius*, Lepel. (Dufour).
(Type *Pompilus nigerrimus*, Scopoli.)
Body not wholly black and not clothed with a silvery pubescence, the abdomen smooth, shining, always red at base; first joint of flagellum in ♀ longer than the second, in ♂ about equal..... (24) *Arochnophila*, Ashm., g. nov.
(Type *Pompilus divisus*, Cress.)
28. Body wholly black, usually more or less clothed with a silvery pubescence; first joint of flagellum in ♀ longer than the second, in ♂ not longer than the second... (23) *Aporoideus*, Ashm., g. nov.
(Type *Pompilus sericeus*, V. de Lind.)
29. Pronotum with the hind margin obtusely angularly emarginate; first joint of flagellum in ♀ always longer than the second, in ♂ sometimes shorter..... 31.
Pronotum with the hind margin arcuately emarginate..... 30.
30. Body in ♂ usually clothed with a silvery pubescence; third cubital cell triangular, usually petiolate, especially in males (19) *Pompilinus*, Ashm.
(Type *Pompilus cylindricus*, Cress.)
31. Body black and usually *with* a more or less distinct silvery pubescence, especially in males; abdomen black, immaculate; third cubital cell triangular and often petiolate or subpetiolate..... (22) *Anoplius*, Lepel. (Dufour).
(Type *Pompilus nigerrimus*, Scopoli.)
Head and thorax usually black, but without a silvery pubescence, the abdomen smooth and shining, always red basally; third cubital cell variable, sometimes triangular and petiolate..... (24) *Arachnophila*, Ashm., g. nov.
32. Pronotum with the hind margin obtusely angularly emarginate . . 33.
Pronotum with the hind margin arcuately emarginate.
33. Submedian cell in front wings a little longer than the median; third cubital cell trapezoidal or narrowed above, never distinctly triangular or petiolate; mandibles in ♀ 3-dentate, in ♂ 2-dentate.

Third cubital cell usually a little smaller than the second ; first joint of flagellum in ♀ longer than the second, in ♂ not longer than the second, about thrice as long as thick ; claws in ♀ with a median tooth, in ♂ cleft. . . (25) *Aphiloctenus*, Ashm., g. nov.
(Type *Pompilus virginensis*, Cress.)

Third cubital cell larger than the second ; first joint of flagellum in ♀ elongate, nearly as long as 2 and 3 united, in ♂ not or scarcely longer than the second, but about four times as long as thick ; claws cleft in both sexes. . . . (26) *Hemisalius*, Sauss.
(Type *H. albistylus*, Sauss.)

Tribe II.—Aporini.

The front wings with one or two cubital cells, never three as in the tribe *Pompilini*, and the slight difference in the insertion of the antennæ, will readily distinguish the tribe.

The group comes quite close to the subfamily *Planicipina*, in which are found forms with only two cubital cells in the front wings, so that the closest attention must be given to the characters used in separating the subfamilies or the student will go astray and confuse some of these forms with genuine *Aporini*.

Table of Genera.

- Metathorax posteriorly rounded, the hind angles unarmed. 2.
Metathorax posteriorly truncate, depressed or emarginate, the hind angles more or less distinctly produced into conical teeth or spines.
Cubitus in hind wings usually interstitial or nearly ; tarsal comb present ; claws with teeth ; mandibles
3-dentate. (1) *Aporus*, Spinola.
(Type *A. unicolor*, Spin.)
2. Cubitus in hind wings originating *beyond* the transverse median nervure. 4.
Cubitus in hind wings interstitial with the transverse median nervure. 3.
3. Transverse median nervure in front wings interstitial with the basal nervure ; tarsal comb in ♀ present ; claws toothed and combed ; mandibles 2-dentate. (2) *Evagetes*, Lepeletier.
(Type *Pompilus bicolor*, Fabr.)
4. Transverse median nervure in front wings uniting with the median vein *beyond* the origin of the basal nervure. 5.

- Transverse median nervure in front wings interstitial or uniting with the median vein *before* the origin of the basal nervure 6.
5. Hind margin of pronotum arcuate; antennæ rather thick; front tarsi with a comb; claws in ♀ with a tooth beneath, in ♂ cleft; second cubital cell receiving one recurrent nervure, the second recurrent joining the cubitus *beyond* the second transverse cubitus (3) *Actenopoda*, Ashm., g. n.
(Type *A. Rileyi*, Ashm., MS.)
6. Front tarsi combed; claws cleft, without or, at most, with only a rudimentary comb 8.
Front tarsi *not* combed; claws with a tooth and combed 7.
7. Pronotum not large, the hind margin obtusely angularly emarginate; second cubital cell triangular (4) *Xenaporus*, Ashm., g. n.
(Type *Pompilus amoenus*, Klug.)
8. Front wings with two cubital cells; hind margin of the pronotum obtusely angularly emarginate (5) *Gonaporus*, Ashm., g. nov.
(Type *Pompilus gracilis*, Klug.)
- Front wings with only one cubital cell; hind margin of the pronotum arcuate (6) *Aporinus*, Ashm., g. nov.
(Kohls gr. 17.)

NEW COCCIDÆ FROM THE ARGENTINE REPUBLIC AND PARAGUAY.

BY T. D. A. COCKERELL, E. LAS VEGAS, N. M.

The Coccidæ herein described were collected by Professor L. Bruner in 1897 and 1898. I examined the collection with more than ordinary interest, as practically nothing was known of the Coccidæ of the Argentine or Paraguay. The flora of the southern part of South America resembles in many respects that of the arid region of North America, and it was therefore not wholly unexpected that this resemblance should extend to the Coccidæ. The collection is too small to show how far such a resemblance may extend, but the species of *Orthezia* and *Lichtensia*, at least, are entirely representative of North American types.

(1.) *Orthezia ultima*, n. sp.—♀. Waxy lamellæ in two dorsal series, with a deep median sulcus, and the usual lateral series; the dark surface of the back is narrowly exposed between the dorsal and lateral series; anterior lamellæ of the dorsal series thick, prolonged over the head, but *not greatly produced nor divergent*; posterior lateral lamellæ narrow and

about equal in length, *not adherent to the ovisac*. Dried ♀ very dark brown, about 1100 μ long and 1200 broad. Ovisac 3 mm. long, fluted above.

Skin densely beset with small spines. Antennæ and legs very dark brown; lighter and redder after boiling. Antennæ 8-jointed, last joint flat on one side, convex on the other, tipped with a spine. Joints measuring in μ : (1.) 60, (2.) 60, (3.) 84, (4.) 45, (5.) 48, (6.) 60, (7.) 57, (8.) 102.

Hab.—Locality uncertain, but probably Ceres, Argentine Republic. On some herbaceous plant (probably Compositæ) with linear leaves. Allied to *O. nigrocincta* from New Mexico.

(2.) *Asterolecanium viridulum*, n. sp.—♀. Scale circular, 2 mm. diameter, yellowish green, with hardly any fringe; ♀ boiled in caustic potash turns madder red; margin with two rows of figure-of-eight glands, those of either row 12–18 μ apart, and one row of simple glands, the latter not different from the scattered glands of the skin. Mouth-parts large, about 120 μ diameter; labium very short, twice as broad as long.

Hab.—Tucuman, July 26, 1897, "on a kind of ironweed." It is close to *A. pustulans*, and, like it, lives on the stems of the plant, producing cavities. It is a larger scale than *pustulans*, and has not the distinct fringe of that insect.

(3.) *Akermes Bruneri*, n. g., n. sp.—♀. Long. 5½, lat. 6½, alt. 5½ mm.; shape and colour, *Kermes*-like; globular, shiny, smooth, broader than long, very pale ochreous, faintly marbled with a darker tint, and sparsely dotted with raised black points, which are perforated in the centre; two sulci extend upwards from the anal region in the form of a V, and other sulci occur somewhat irregularly; some individuals have a dusky reticulation. Inferior aperture, long and narrow (long. 5, lat. 1½ mm.), broadly margined with piceous.

♀. Boiled in caustic potash turns the liquid a dark yellowish brown; skin with a microscopical polygonal reticulation, after the manner of *Eulecanium*; no legs or antennæ found; in the adult the anal plates are wholly obscured, the anal region being occupied by a large, very thick, dark red-brown chitinous mass, having a coarsely radiate structure; in half-grown specimens the usual two plates are easily seen. The skin presents a number of large round dark chitinous areas, such as Signoret figures for *A. verrucosus*.

Larva of ordinary form, with a row of large figure-of-eight (double) glands on each segment; numerous smaller round glands; no spines except the marginal ones, one on each segment on each side, about $15\ \mu$ long; no greatly produced caudal tubercles; caudal bristles two, moderately long; anal ring with six long bristles. Antennæ 5-jointed, joint 5 with very long bristles. Joints measuring in μ : (1.) 21, (2.) 15, (3.) 42, (4.) 30, (5.) 42.

Hab.—San Bernardino, Paraguay, Sept. 23, 1897, on spiny plant, probably leguminous.

The genus *Akermes* is closely related to *Lecanium*, but is distinguished by its globular form, round chitinous areas in the skin, microscopical tessellation, and the characters of the larva as described. It has some resemblance to *Cryptes* from Australia, but it is not likely that it has the peculiar male scale of that genus.

One other species is known, *Akermes verrucosus* (*Lecanium verrucosum*, Signoret), which I had erroneously referred to *Saissetia*. This is from Montevideo, and is very much larger than *A. Bruneri*.

(4.) *Lichtensia simillima*, n. sp.—♀. Red-brown, with a narrow white margin, varying to ochreous; ovisac white, firm, texture leathery; ♀ with ovisac about $5\frac{1}{2}$ mm. long, $2\frac{1}{2}$ high.

♀. Margin with strong simple spines, about $25\ \mu$ long and 30 apart; skin with many tubular glands; labium small and semicircular (as in *L. viburni*); anal plates triangular, about $180\ \mu$ long, outer sides about equal, upper surface with a long finger-like process passing from near the middle backwards and inwards, the two processes nearly meeting in the middle line.

Middle leg: femur and trochanter about $270\ \mu$, tibia 180 , tarsus 120 ; tarsal digitules filiform, 60 long; claw digitules slender, about 24 long. Antennæ 8-jointed, with sometimes a "false joint" in the third; joints measuring in μ : (1.) ?, (2.) 45–48, (3.) 96–105, (4.) 33–39, (5.) 48–51, (6.) 36, (7.) 33, (8.) 51.

Hab.—On some shrubby plant. The label reads, "Scale, General Acha." Closely related to *L. lycii* from New Mexico.

Ceroplastes. (*Wax Scales.*)

The female insects are to be separated by the following tables:—

(a.) External Characters.

Wax of the different individuals confluent, wholly surrounding the branch.....*Bruneri*.

- Wax not thus surrounding branch..... 1.
1. Waxy scale small, adults less than 5 mm. long, light yellowish...*scutigera*.
Waxy scale larger, over 5 mm. long..... 2.
 2. Wax light amber, two lines of white secretion down each side.. *Mendoza*.
Wax creamy white, no line of white secretion down each
side..... *Bernardensis*.

(b.) Microscopical Characters.

- Strongly chitinous, with well-defined patches of perforations.. *Bruneri*.
Less chitinous, without such patches..... 1.
1. Small species, under 3 mm. long, with a large, very well defined chitinous caudal patch.....*scutigera*.
Larger, with the chitinous caudal area gradually shading into the surrounding areas..... 2.
 2. Antennæ 7-jointed, about $90\ \mu$ long..... *Mendoza*.
Antennæ 8-jointed, about $240\ \mu$ long..... *Bernardensis*.

(5.) *Ceroplastes Bruneri*, n. sp. (T. D. A. & W. P. Ckll.).

♀. Wax cream-colour, surrounding twigs, the whole mass 15 mm. diam, the twig being 7 mm.; dorsal nuclei shining white, sunken in deep depressions; close behind each is a small aperture through which the caudal horn is seen; the waxy mass is conspicuously flecked with snow-white secretion.

♀. Dark red-brown, dorsally almost black, basally lighter and redder; subpyriform, with a truncate base; alt. $5\frac{1}{3}$, long. 4, lat. 5 mm., breadth of base $2\frac{1}{2}$ mm.; dorsum shiny; caudal horn short, placed at top of posterior slope and directed upwards. The horn is placed higher up than in *C. candela*. The insects are not separated by wax, but their adjacent sides show much chalk-white secretion, in vertical bands. Skin (dorsal and lateral surfaces) strongly chitinous throughout, orange-feruginous by transmitted light, anal region a rich dark chestnut; large oval areas (the largest about $240\ \mu$ long) full of perforations; at and near the margins the skin is strongly tuberculate, and perforate; antennæ and legs ordinary. Legs measuring in μ : femur + trochanter, about 135; tibia 105 (with a rather long hair $27\ \mu$ from the end); tarsus 75; claw 33, slender, nearly straight, with a slight denticle within near the base; tarsal digitules $45\ \mu$ long, rather stout.

Hab.—San Bernardino, Paraguay, Sept. 23, 1897. Close to *C. confluens* and *C. utilis*, but especially to the S. African *C. candela*.

(6.) *Ceroplastes scutigera*, n. sp.—♀. Waxy scale about $4\frac{1}{3}$ mm. long, 3 broad, and 2 high; pale ochreous, with a lateral patch of white secretion, but no distinct lines; wax not divided into plates; area around central nucleus not darkened. ♀ denuded of wax, about 2 mm. long, flattish, margin tuberculate, caudal horn short. Skin semitransparent, except anal area, which is occupied by a very large and conspicuous red-brown chitinous patch, which has perfectly-defined margins, and a transverse diameter of about $900\ \mu$; this patch shows a few scattered perforations, and just above the anal plates are a large number of furrows radiating from small perforations; anal plates with their long outer inferior slope strongly convex; margin with very numerous short stout spines; antennæ very pale, only about $300\ \mu$ long, 7-jointed, joints measuring: (1.) 30, (2.) 45, (3.) 60, (4.) 75, (5.) 27, (6.) 24, (7.) 33. Femur + trochanter, 177; tibia, 123; tarsus, $70\ \mu$.

Hab.—Ceres, Argentine Republic, June 30, 1897, on a shrub with small entire oval-lanceolate leaves. This may be compared with: (a.) *C. minutus*, which is closely allied, and has the same well-defined caudal patch; but it also has two chitinous patches on each side, containing perforations, these being quite absent in *scutigera*. (b.) *C. speciosus* has the caudal patch just as in *scutigera*, and lacks the lateral patches of *minutus*; it has spines only near the stigmata (for a distance of about $210\ \mu$ on each side), whereas *scutigera* has them all around; the antennæ of *speciosus* are very short, only about $165\ \mu$ long; externally, *speciosus* is easily distinguished from *scutigera* by its dark reddish wax, with a large whitish dorsal patch. (c.) *C. rotundus* is smaller, with well-defined waxy plates. (d.) *C. purpureus* is much smaller. (e.) *C. Iheringi* looks just like *scutigera* externally, but it has not the caudal patch. (f.) *C. formosus* has bright yellow wax.

(7.) *Ceroplastes novaesi mendozæ*, n. subsp.—Waxy scale about $6\frac{1}{2}$ mm. long, 6 broad, 5 high; pale amber, with a decided ferruginous tint; sides with two white lines more or less defined; wax not divided into plates, strongly nodulose.

♀. Denuded of wax lively ferruginous, convex, about 5 mm. long, 4 broad, $3\frac{1}{2}$ high; dorsum rounded, without prominences; caudal horn short, directed upwards, from hind margin to tip of caudal horn is about $2\frac{1}{2}$ mm. Skin not very strongly chitinized, except around anal area; diameter of mouth-parts about $135\ \mu$; antennæ about 180 – $195\ \mu$ long, joints measuring: (1.) 24, (2.) 33, (3.) 24, (4.) 36, (5.) 18, (6.) 20, (7.) 25;

the suture between 3 and 4 is not very distinct. Legs with femur + trochanter 90; tibia 51; tarsus 50, or rather more.

Hab.—Mendoza, Argentine Republic, Jan. 26, 1898, on pithy stems of some herbaceous plant. This agrees with Hempel's *C. novasi* in the small legs, with the tibia and tarsus about equal; it also agrees externally, except that the wax of *novasi* is paler and not so red. It seems best to regard the two as geographical races of one species.

(8.) *Ceroplastes Bernardensis*, n. sp.—Waxy scale about $6\frac{1}{2}$ mm. long, 6 broad, and $5\frac{1}{2}$ high, creamy white, not divided into plates nor marked with white lines; dorsal nucleus white, with no dark area surrounding it. Denuded ♀ lively ferruginous, blackish dorsally; length $4\frac{2}{3}$, breadth 3, height $2\frac{1}{2}$ mm.; dorsum with a longitudinal crest; caudal horn short but large, *directed backwards*.

Anal area with a ferruginous chitinous patch, the edges of which are not well defined; anal plates shaped as in *C. scutigera*; skin with scattered minute perforations; mouth-parts small, about $130\ \mu$ diameter.

Femur + trochanter, $135\ \mu$; tibia 100; tarsus 66.

Antennæ about $240\ \mu$ long, 8-jointed; joints measuring: (1.)?, (2.) 42, (3.) 33, (4.) 33, (5.) 39, (6.) 18, (7.) 18, (8.) 30.

Hab.—San Bernardino, Paraguay, Sept. 23, 1897. On twigs of undetermined plant. This agrees externally with the species which Hempel regards as *C. janeirensis*, but the structure appears to be different. I cannot reconcile Hempel's *janeirensis* with Signoret's account of that species, and believe it is wrongly identified. The South American species of *Ceroplastes* are so numerous that it is next to impossible to identify them by such descriptions as were given by the older authors; fortunately, these descriptions are few, and the great majority are well described by Mr. Hempel.

C. Amazonicus resembles *Bernardensis*, but on close inspection it is seen that the wax is divided into plates, though the sutures are colourless.

A CANADIAN ANOPLONYX.

BY W. HAGUE HARRINGTON, F. R. S. C., OTTAWA.

Among Hymenoptera which I sent to Provancher in 1885 was a sawfly which he determined as *Nematus malacus*, Nort. As it did not correspond to the description of that species, it was set aside with some undetermined material. While rearranging my Nematidæ, I recently examined the insect to ascertain its generic position, and found that

it had simple claws. As it has not the appearance of *Gymnonychus*, I was somewhat puzzled until, on examining the wings, I found that the lanceolate cell was widely contracted as in the subfamily *Cladinæ*, instead of petiolate as in the *Nematinæ*. The insect, therefore, must be placed in the genus *Anoplonyx*, which Marlatt has separated from *Camponiscus*, which has bifid claws. As no representatives of these genera were known to Marlatt when he published his Revision of the *Nematinæ* (Technical Series No. 3; Dept. Agric., U. S., 1896), the following description of this Canadian form is submitted:

Anoplonyx Canadensis, n. sp.—Length, 5 mm. Rather slender; black, impunctate; frontal area distinct, but not strongly marked; clypeus emarginate; antennæ slender, piceous, finely pubescent, joints three to five subequal; edge of clypeus, labrum, mandibles, tegulæ and legs, except coxæ, pale honey-yellow; veins of wings pale, especially the costa and stigma; four submarginal cells, the second receiving both recurrent nervures.

One ♀ collected at Ottawa about 1885.

CHANGES IN THE COLOUR OF BUTTERFLIES.

BY A. RADCLIFFE GROTE, HILDESHEIM, GERMANY.

While studying the specializations of the wing in the *Papilionides*, the general results of which are published in the Proc. Am. Philosophical Society, Jan., 1899, I found that *Iphiclides*, *Ajax*, *Marcellus*, etc., differed so strongly from the type of *Turnus* as to be generically separable. *Ajax* is, in fact, allied to species having a greenish or yellowish white ground colour, from South America and the Old World, while *Turnus* is evidently related to the black North American forms, *Troilus*, etc., with which it flies. This fact enables me to draw the probable conclusion that *Glaucus* represents the original colour of the species, which, so to speak, is turning into *Turnus*. The black ♀ *Glaucus* is the more conservative, whereas the males are already, with very rare exceptions, of the yellow type of *Turnus*. It is different with certain cases of so-called "melanism," now spreading in Europe, as *Eubyja* var. *Doubledayaria*, and *Aglaia* vars. *fere-nigra* and *melaina*. Here the original ground colour is changing to black indifferently in both sexes.

Conversely it is the male *Callosamia promethea* which appears to have more recently become black, while the female retains what was probably the original red-brown colour of the species. I have alluded to this probability in my paper on the Saturnians, Mitt. aus d. Roemer Museum, June, 1896, p. 14. When compared with *C. angulifera* in this respect, *C. promethea* seemed to me to be the younger, more modern form, in which sexual dimorphism has more recently taken place.

THE YELLOW-WINGED CATOCALÆ.

BY G. H. FRENCH, CARBONDALE, ILL.

At the time of writing the paper on the red-winged Catocalæ* I thought I should very soon complete the list ; but other matters have too long crowded out the work I had planned to do. I shall now give, however, my idea of how they should be arranged, with some notes on some of the species. The numbering is continuous with the numbering of the red-winged species :

- | | |
|------------------------------|---------------------------|
| 62. Nebulosa, Edw. | 80. Badia, G.-R. |
| 63. Piatrix, Grote. | 81. Coelebs, Grote. |
| 64. Dionyza, Hy. Edw. | var. Phoebe, Hy. Edw. |
| 65. Neogama, A.-S. | 82. Habilis, Grote. |
| var. Communis, Grote. | var. Basalis, Grote. |
| var. Snowiana, Grote. | 83. Clintonii, Grote. |
| 66. Subnata, Grote. | var. Helene, Pilate. |
| 67. Cerogama, Guenée. | 84. Abbreviatella, Grote. |
| var. Bunkerii, Grote. | 85. Whitneyi, Dodge. |
| 68. Paleogama, Guenée. | 86. Nuptialis, Walker. |
| var. Annida, Fager. | <i>Myrrha</i> , Strecker. |
| var. Phalanga, Grote. | 87. Polygama, Guenée. |
| 69. Consors, A.-S. | <i>Blandula</i> , Hulst. |
| 70. Muliercula, Guenée. | var. Cratægi, Saunders. |
| var. Peramans, Hulst. | var. Mira, Grote. |
| 71. Delilah, Strecker. | 88. Pretiosa, Lintner. |
| <i>Adoptiva</i> , Grote. | 89. Amasia, A.-S. |
| 72. Desdemona, Hy. Edw. | <i>Sancta</i> , Hulst. |
| 73. Calphurnia, Hy. Edw. | var. Virens, French. |
| 74. Andromache, Hy. Edw. | 90. Cordelia, Hy. Edw. |
| 75. Frederici, Grote. | 91. Chelidonia, Grote. |
| 76. Illecta, Walker. | 92. Similis, Edw. |
| <i>Magdalena</i> , Strecker. | <i>Formula</i> , Grote. |
| 77. Serena, Edw. | var. Aholah, Strecker. |
| 78. Amestris, Strecker. | var. Isabella, Hy. Edw. |
| <i>Anna</i> , Grote. | 93. Fratercula, G.-R. |
| var. Westcottii, Grote. | var. Atarah, Strecker. |
| 79. Antinympha, Hubner. | var. Jaquenetta, Hy. Edw. |

*CAN. ENT., XXXIII., 205 (July, 1901).

- | | |
|-------------------------|-----------------------------|
| var. Ouwah, Poling. | 100. Gracilis, Edw. |
| var. Timandra, Hy. Edw. | var. Sordida, Grote. |
| var. Hero, Hy. Edw. | 101. Minuta, Edw. |
| var. Gisela, Meyer. | var. Parvula, Edw. |
| 94. Olivia, Hy. Edw. | var. Mellitula, Hulst. |
| 95. Præclara, G.-R. | 102. Amica, Hubner. |
| 96. Dulciola, Grote. | <i>Androphila</i> , Guenée. |
| 97. Grynea, Cramer. | var. Lineella, Grote. |
| var. Constans, Hulst. | var. Nerissa, Hy. Edw. |
| 98. Alabamæ, Grote. | 103. Jair, Strecker. |
| 99. Titania, Dodge. | |

I have examined a number of specimens of *Dionysa*, Hy. Edw., from Arizona, through the kindness of Mr. Poling, and see no reason for calling it a variety of *Piatrix*, Grote. The wings are constantly lighter and somewhat differently marked, and it is a smaller insect.

Desdemona, Hy. Edw., is quite a distinct form from *Delilah*, Strecker. While the mesial band of hind wings shows that it belongs to the same group, the general aspect and markings of the fore wings are quite different. The Eastern form *Delilah* has the general tone of the fore wings a distinct brown, while the Western form is gray, with lighter hind wings. All the Eastern forms I have seen agree with Dr. Strecker's figures, plate 11.

I do not know Henry Edwards's species *Calphurnia* and *Andromache*, except in the descriptions. As to *Badia* and *Coclebs*, there is quite a difference of opinion. From all the examples I have seen, I should regard them as distinct. Mr. C. M. Dodge, of Louisiana, Mo., says that, on the authority of his collectors, they fly at different times. I have seen no intergrades, and will leave them as distinct till breeding settles the question.

Abbraviatella and *Whitneyi* are very close, but from all the examples that have come to me, they seem distinct. They fly at different times, and *Abbraviatella* is the more northern form. I would suggest that Mr. Dodge should make an effort to breed *Whitneyi*, which occurs in his locality, and thus settle the question.

It seems to me that there is little excuse for the name *Blandula*. Our specimens of *Polygama* agree as well with Guenée's figure and description as we can expect of any of the figures and descriptions of the period in which they were made. With regard to *Cratagi* and *Mira*,

they seem to me to be varieties of *Polygama*. None of the forms occur here, but many times I have been called upon to identify them, which I have done with hesitation. Last summer a lot of bred specimens were sent me which contained all three of the forms, but the larvæ seemed to the one who bred them to be identical. Of course, this is not as conclusive as breeding from one brood of eggs, but from this and other observations I should place them together.

I append here three figures, one of *Amasia*, A.-S. (Fig. 1), as it flies in our woods in July. The second is a copy of Abbott's figure of *Amasia* (Fig. 2). The third is a figure of *Cordelia*, Hy. Edw. (Fig. 3), as it also occurs here in the same month. As to the latter, my first examples were identified by Henry Edwards soon after he described the species, so that I have no hesitation in thinking that I know his species. I have taken both forms for a number of years and have never found any variation of



FIG. 1.



FIG. 2.



FIG. 3.

one towards the other. *Amasia* is rather a variable species, the variations consisting in some being lighter than others, and in some showing a greenish tinge as in var. *Virens*. On the other hand, *Cordelia* varies but little. As to which one Abbott had before him when he made the figure, I think no one who sees these figures will doubt. I have shown these figures to several who are well versed in the genus, and without hesitation they said *Amasia* as I have it here and not *Cordelia*. Dr. Strecker's figure 12, plate 9, is a very good copy of either Abbott's figure or of a specimen of *Amasia*.

I have many times had *Alabama* from the South for identification, and I can see no reason for regarding it as a variety of *Grynea*. The

colour of the fore wings is always lighter and of a greenish tinge, and there is less brown in the markings.

Mr. Dodge's addition to the list, *Titania*, is a good species. So is, also, Dr. Strecker's addition, *Jair*. I have seen examples of both of these.

Before closing this I want to speak again of the *Junctura* group. The more I see of the Arizona specimens, the more satisfied I am that the Texan form is separate from both of those that occur in Arizona. There are two forms there: one that is even reddish gray, that should be known as *Babayaga*, Strecker; the other one is a more broken light and dark reddish gray, and this is *Arizona*, Grote. The Texan form is a larger insect than either of the Arizona forms, of an even greenish gray, and may be known as *Texana*.

THE DECTICINEAN GENUS EREMOPEDES.

BY A. N. CAUDELL, WASHINGTON, D. C.

The genus *Eremopedes* was established by Scudder in 1894, CAN. ENT., XXVI., p. 178, 181. It was founded on a female specimen in the National Museum, but the species was not described till 1900. Previous to that date Mr. Cockerell described a species from New Mexico, together with a colour variety of the same, and I can now add a third species to the genus. In connection with its description it may be well to give a short account of the genus, which may be characterized as follows:

Insects of medium size. Head with the fastigium moderately prominent. Thorax with the prosternum unarmed.* Pronotum smooth, moderately rounded, nearly as much arched posteriorly as anteriorly, and without carinæ. Legs moderately spinose, hind pair long, the femora extending far beyond the tip of the abdomen, usually as much as half their length. Fore tibiæ spined above on the outer margin only, the spines three in number. Ovipositor moderately curved upwards.

The species, so far as now known, occur in the south-western part of the United States, from Colorado southwards, and all appear to be comparatively rare. The species may be separated as follows:

A. Lateral lobes of the prothorax well developed, the posterior border distinctly sinuate. (Fig. 4b.)

a. Larger. Unicolorous, a uniform pale

brown.....*unicolor*, Scudd.

aa. Smaller. Variegated, dark above, paler below...*Balli*, n. sp.

* There are two small blunt spines present, but they are not conspicuous.

AA. Lateral lobes of the prothorax somewhat feebly developed, the posterior border without a sinus. (Fig. 4a.)

a. Colour brownish ochreous marked with black..... *Scudderi*, Cock.

aa. Uniformly apple green in colour... *Scudderi*, var. *viridis*, Cock.

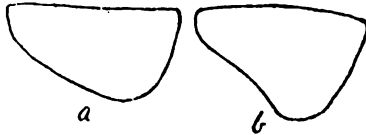


FIG. 4.

EREMOPEDES UNICOLOR, *Scudd.*

Eremopedes unicolor, Scudd., Cat. Orth. U. S., 78, 97-98, pl. 2, fig. 1 (1900); Index N. A. Orth., 110 (1901).

The author's description is here given :

"Nearly uniform dull brownish testaceous, the hind femora feebly infuscated apically. Head full, the face somewhat ferruginous and the genæ with fuscous blotches, the fastigium rather prominent, rounded; antennæ very slender, about half as long again as the body, testaceous. Pronotum well rounded, equally arched in front and behind, without lateral or median carinæ, the front margin feebly convex, the hind border truncate, but laterally rounded; lateral lobes obliquely deflexed, well rounded beneath, the oblique posterior margin with a distinct though slight sinus. Tegmina aborted. Legs rather long and slender, the fore tibiæ with three spines above on outer margin. Ovipositor more than two-thirds as long as the hind femora, distinctly arcuate, moderately slender, faintly tapering, apically acuminate, castaneous, the apical margins darker.

"Length of body, 25 mm.; pronotum, 8 mm.; fore femora, 7 mm.; hind femora, 21 mm.; ovipositor, 16.5 mm.

"One female. Arizona, U. S. National Museum." (Type No. 5736.)

It is pointed out by the describer that this, being the species on which the genus was established, is the type of the genus, even though another species, *E. Scudderi*, Cock., had been previously described. This view may be questioned according to the latest published laws on this subject, and the genus previous to the publication of Cockerell's species in 1898 was certainly invalid, being based on an undescribed species. However, the circumstances seem to justify the retention of *unicolor* as the type of *Eremopedes*, Scudd.

EREMOPEDES BALLI, n. sp.

Very similar in form to *E. unicolor*, but readily distinguished from that species by the average smaller size and varied coloration. It is also a slightly less robust species.

General colour brownish above, much lighter below. Head moderately full, dark brown above, face and lower part of the genæ pale, the upper portion of the genæ generally much mottled with fuscous. Mandibles rufous distally, with piceous teeth, the overlying labrum pallid. The fastigium as in *unicolor*. Eyes black, small, rounded, slightly longer than broad. Thorax shaped as in *unicolor*, very dark above and pallid below, the lateral lobes ample and with pale yellowish margins, broadest on the posterior margin; this pale emargination is continued narrowly across the anterior edge of the pronotum above, but on the posterior edge it gives way above, and towards the upper part of the lateral lobes to a narrow piceous emargination. Abdomen dark above, but usually distinctly lighter than the pronotum and pallid beneath. Legs light brown, paler beneath, the posterior femora black at apex, armed beneath on inner side with from 1-3 short spines, usually 1; fore and middle femora with a small genicular spine, often very indistinct or absent on the anterior ones. All the tibiæ spined both above and below, the spines concolorous with the tibiæ, and usually, especially those on the upper side of the posterior pair, apically infuscated. Wings invisible in the female, in the males the tympanum is visible, a fourth as long as the pronotum, very dark brown, with veins and margins pallid. Ovipositor gently arcuate, castaneous, apically infuscated.

Length of body: male 19-24 mm., female 20-25 mm.; pronotum, male 5.5 mm., female 6-6.5 mm.; hind femora, male 15.5-17 mm., female 18.5-21 mm.; ovipositor, 13-15 mm.

Six males, three females, Ft. Collins, Colorado. (Type No. 6150, U. S. Nat. Mus.)

These specimens were collected on August 10th, 1901, on a stony hill a mile or so west of Ft. Collins. They were very active in eluding pursuit, and their colour harmonized so well with the surrounding grass and stones that they were with difficulty captured. They mature early in August and seem to be quite local in their distribution. I was guided to their haunts by Mr. E. D. Ball, to whom I take pleasure in dedicating the species.

EREMOPEDES SCUDDERI, Cock.

Eremopedes Scudderi, Cock., Ann. Mag. Nat. Hist. (7), II., 323-324 (1898); Scudd., Cat. Orth. U. S., 78 (1900); Index N. A. Orth., 109 (1901).

The original description is here given in full :

"Length of body 19-21 mm., of pronotum 6 mm., hind femora 21.33 mm., hind tibiæ 23 mm., ovipositor 19.20 mm., antennæ about 51 mm.

"Sepia brown in effect, but in reality ochreous, closely and finely marked with blackish; the density of the black marking somewhat variable, but the lateral margins of the pronotum always broadly pale ochreous. Pronotum truncate in front and behind, the margins narrowly castaneous and slightly concave; lateral lobes not greatly developed. Ovipositor dark brown, only moderately curved. Hind femora with 5-7 very short spines on the inner side; hind tibiæ with from 28 to 33 spines in the outer row. Spines of the anterior tibiæ pale ochreous, tipped with black and having a black longitudinal line on the upper side; there is also sometimes a black patch immediately at the base of each spine. Spines of hind tibiæ brown tipped with black, but the ridge from which they spring is whitish.

"Var., *viridis*. Similar to the type, but entirely bright apple-green.

"*Hab.*—Mesilla Park, New Mexico, on the campus of the New Mexico Agricultural College. Eight of the brown form and two of the green. They were found in an outhouse, and are doubtless nocturnal in their habits. One specimen was found in the jaws of a *Scolopendra heros*, which had killed it."

The National Museum collection contains one male specimen of this species from Mesilla Park, N. M., a topotype probably sent by Prof. Cockerell. The pronotum of this specimen is dark ferruginous above, and the posterior femora are but 19 mm. in length. The pronotum is also slightly flattened posteriorly above, probably due to shrinkage in drying.

I desire to acknowledge the kind consideration of an unknown friend, in sending to me 38 *Cecropia* cocoons, apparently all sound. The package bore the postmark of Chicago.

J. ALSTON MOFFAT, Cur. and Libr., Ent. Soc., Ont.

Erratum.—Page 67, third line, for *Hammaniella* read *Harrimaniella*.

LABELS.

Anyone who has had even the slightest experience in attempting to get intelligent notes to accompany his acquisitions by exchange has doubtless been sorely vexed—to put it no more strongly. Anyone who has tried to keep a careful record of the conditions under which his own collections were made has also doubtless felt the need of some better scheme than the regulation notebook. It is for these reasons that I suggest an idea which I find very useful.

In the first place, I write (or print with a hand stamp) my own locality labels so that I can fix the places definitely. The ordinary entomologist, unless he has a large collection from precisely the same *limited* locality, can scarcely afford to have special labels printed, and general ones are useless when the collection is to be used for more than a purely æsthetic exhibition. “Chicago, Ill.” tells almost nothing of value for Chicago, if only the region within city limits is meant; it is a big place and any attempt to find a second specimen must necessarily be made as much in the dark as the first.

But the real plan which I wish to present is one by which full notes of the insect's environment are kept upon the same pin with the insect, and its ecology can thus be taken in with the same glance that sees the mounted specimen.

Botanical ecologists have divided plant habitats into hydrophytic, mesophytic, and xerophytic. The same classification can be applied to animals, and we would term those insects living in moist situations “hydrozoic.” “Xerozoic” follows naturally for the dry habitats; but when we come to “mesozoic” we have an interesting preëmption by the geologists. Nevertheless, whatever the names used, the habitat types remain, and I have chosen to represent them in the following manner:

Across the top of the locality label a solid (——) blue line indicates that the specimen was found in water—the most extreme hydrozoic situation imaginable. A line of blue dashes (----) means that the insect was taken in a swamp; while blue dots (.....) signify a swale. Green is used for medium conditions—a solid green line standing for dense woods; green dashes for open woods; and green dots for thickets. A solid red line represents the driest sort of places—a desert or dry rocks; red dashes, grass land, prairie, etc.; and red dots, the boundary between grass land and forest.

This may seem to be a very cumbersome plan, but I feel confident that a little use will convince even the most skeptical that it is not. My labels are cut from sheets of thin Bristol-board which have previously been ruled as indicated above—the lines being spaced according to the size of the labels desired. This ruling may be done with a pen and different coloured inks, or any printer will do it quite cheaply. The cutting is done so that the lines come at the top of the finished label, and a supply of each kind of these is kept in separate compartments in my label box. It is then as easy a matter to pick out the right sort of slip upon which to write the locality as it is to use a plain white label which means nothing.

One beauty of the plan is that it is capable of almost indefinite expansion, and so can never be outgrown. An addition which I have found useful is to have a supply of very small bits of paper, or preferably light Bristol-board. These are of various colours and shapes. If the specimen be of a night-flying species, I put a square black bit on the pin just above the locality label. If it be active only at twilight, I use a narrow black bit. If it was found in the ground, a square brown bit in the same place shows that; while a narrow brown piece indicates that it was found under a board, stone, or some such thing. A minute green square tells at a glance that the insect lived in a tree; a green oblong stands for a log; and a roughly circular green bit signifies a stump habitat. A yellow square indicates a carrion insect; while a yellow oblong is put upon the pin of one found in manure. And so we can run through the whole gamut of insect environment, although, I think, these will be found to cover most of the ground, providing we add a symbiosis label. This may conveniently be a white one, small as possible, upon which is written the name of the other symbiont; e. g. "golden-rod," "dog," or "Formica *sp.*"

We have, by this means, always with the insect, not only the date and locality of its capture, but compact notes of its habitat and general environment. Your notebook is always open and never lost. A case of insects becomes, in fact, a notebook illustrated by specimens. It is then something more than mere "dried bugs," interesting as they may be. Furthermore, a supply of such labels taken into the field is an exceedingly easy and accurate method of making field notes, as the appropriate ones can readily be slipped into the paper or box with the insect.

FRANK E. LUTZ, Chicago, Ill.

NOTE ON CTENUCHA CRESSONANA.

BY A. RADCLIFFE GROTE, HILDESHEIM, GERMANY.

In the Catalogue of the Lep. Phalænæ, p. 528, this species is incorrectly referred to *C. venosa*. The specimens there recorded are probably all *C. venosa*, at least those from my collections are. Mr. Geo. Francke sends me two fresh specimens of *C. Cressonana*. In these, as stated in my original description, Proc. Ent. Soc., Phil., June, 1863, the third stripe of *C. venosa* is wanting. The stripes on cubitus and branches and along anal region of primaries may vary from white (as I described them) to yellow, and the costa may be yellow (in the first instance) or red. For the yellow-striped form with red costa I propose the name var. *lutea*. The fringes in *C. Cressonana* are entirely white, and I was careful to point out other differences from *C. venosa*, which should not have been overlooked by the author of the Catalogue above referred to.

ON THE USE OF EUPETHECIA.

BY A. RADCLIFFE GROTE, HILDESHEIM, GERMANY.

In reference to a recent "protest" in the pages of the CAN. ENT. (Vol. XXXIII., p. 263) against a change in the generic name *Eupethecia*, I believe its abandonment, in favor of a Hübnerian name chosen cut of the Verzeichniss by Mr. Meyrick, to be invalid. I retain it myself in the collection here for the reason that its date is certain, and there is a rule of the German zoological code that if exact dates cannot be ascertained (and this is the case for that part of the Verzeichniss which contains the Geometrids), preference shall be given to the genus which has a type cited. This is reasonable, and custom has correctly sanctioned the use of *Eupethecia*. I am indebted to Mr. L. B. Prout, of London, England, for the information that Curtis himself, in founding the genus *Eupethecia*, explicitly chooses *absinthiata*, L., as type of the genus, April 1, 1825. In my study of the Geometrid genera (1895-96), only a fragment of which appeared in the Transactions of the Entomological Society of London, I pointed out some of the errors into which I have reason to believe Mr. Meyrick has fallen. I express here no opinion as to the use of *Phalæna* as a generic title, but, if used, I believe its restriction by Fabricius in Gen. Ins. Mant., 1777, would give *prosopiaria*, L., as type. The European *papilionaria* is the type of *Terpne*, Hübner, 1806. I have not found the type of *Geometra*. I believe we must keep *Eupethecia* for the "pugs."

DESCRIPTION OF A NEW NOCTUID.

BY HARRISON G. DYAR, WASHINGTON, D. C.

Aleptina inca, n. gen., et sp.

Two males, Arizona (Cox) ; So. Ariz., Apr. 1-15 (Poling).

Fore wings gray, cinereous shaded at base, followed by a large ochreous patch that extends to the t.-a. line on lower half of wing. T.-a. line upright, germinate, black, twice waved ; orbicular large, oval, whitish, black ringed and containing a large, oval, brown-black centre ; reniform similar, but obscure and lost in a pale shade that extends to costa at t.-p. line. T.-p. line black, parallel to external margin cut off above by the white shade, followed closely outwardly by a blackish subterminal line. A crenulated, pale, blackish edged terminal line. Fringe pale, dark spotted. Hind wings whitish, a dusky shading before the fringe. Abdomen gray ; thorax concolorous with fore wings. Expanse 23 mm.

Two females, Comfort, Texas (Holland) ; Kerrville, Tex. (Barnes).

Similar to the male, but paler, more ashen gray, the markings less contrasted ; hind wings largely shaded with brownish gray except on the base and on the fringe. Expanse 23 mm.

Antennæ filiform ; front moderately produced, with a wide platelike projection above, nearly as wide as the space between the eyes, a similar, but curved and less prominent plate below on the lower edge of the front. Palpi upcurved, reaching above the middle of the front, uniform, scaled, the third joint slightly narrowed at base. Tongue distinct. Fore femora stout, tibiæ short, unarmed ; tarsi spined ; hind tibiæ with the spurs long. Thoracic vestiture of broad flat scales ; abdomen untufted. Vein 5 of hind wings distinct, arising from lower part of cell. Wings shaped much as in *Baileya*, Grote (*Leptina*, Guen., nec Meig.), but narrower.

BOOK NOTICES.

GENERA INSECTORUM.—Published by P. Wytzman, 108 Boulevard du Nord, Brussels, Belgium.

The first part of this important work has been received and amply fulfills any expectations that one may have formed regarding its style and appearance. It is of quarto size, beautifully printed, with broad margins to the leaves, and an admirably-executed plate in black and white. The family Gyrinidæ (Coleoptera) is treated by Dr. Regimbart, who gives a general description of the characteristics of the family and a synoptic

table of genera ; this is followed by descriptions of each genus and a list of the species belonging to it, with their geographical distribution. On the plate a specimen of each genus is depicted, with beautifully clear figures of structural details.

The original plan of publication has been somewhat modified and the work will now be issued in smaller parts, each containing a single family of insects. The price will vary in accordance with the number of pages and plates contained in the part, at the rate of 1 franc 60 per plate and 20c. per page. The first part, consisting of 12 pages and 1 plate, will thus cost 4 francs = 80 cents. The language adopted for the work is French. It is to be hoped that the number of subscribers will be sufficient to enable the enterprising publisher to complete the work without loss ; he certainly cannot have any anticipations of profit.

FUMIGATION METHODS.—By Willis G. Johnson, New York : Orange Judd Company, 52 Lafayette Place. One Vol., pp. 313. (Price, post-paid, \$1.00.)

The writer of this handy volume is well-known amongst economic entomologists as the Apostle of Hydrocyanic Acid Gas, the virtues of which as an effective insecticide he has never lost any opportunity of extolling. He has now brought together in concise form the results of his own methods as well as the experiences of others, and furnishes a most convenient manual of information for fruit-growers, florists, nursery-men and others who may be compelled to resort to this drastic means of exterminating noxious insects. The material used for fumigation is of such a deadly poisonous nature that it cannot be recommended for general use and should only be adopted by experienced persons who understand the necessary precautions and will see that they are carefully carried out. The study of this book will give all necessary information regarding the practical application of the gas, the apparatus required and the appliances that have been found most satisfactory, and it should be in the hands of everyone who has anything to do with fumigation. Besides the gas referred to, an account is given of the use of Carbon Bisulphide, which—with simple precautions—may be employed by anyone for the destruction of household pests, underground vermin, mill or granary insects. The book is fully illustrated and written in a clear and concise manner.

Mailed April 5th, 1902.

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The
Canadian Entomologist

VOLUME XXXIV.

No. 5.

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EDITED BY

REV. C. J. S. BETHUNE,

LONDON, ONTARIO.

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1902.

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EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

HYDRECEIA.—Will exchange larvæ, pupæ and imagoes of *H. rutila* for other species of this genus. A. F. WINN, 58 Bruce Ave., Westmount, Que.

BEEES.—Fresh specimens of all the species of *Andrena* from various localities north of Mexico desired for working over the genus. PROF. L. BRUNER, University of Nebraska, Lincoln, Neb.

PLUSIAS WANTED.—Having just described some new *Plusias*, all from females, I wish to obtain males of these and specimens of others in which my series is short. Very liberal returns. DR. R. OTTOLENGUI, 80 West 40th Street, New York.

EUROPEAN COLEOPTERA.—I have a large quantity of European Coleoptera which I wish to exchange for American. Lists furnished. PAUL J. ROELOFS, 90 Rue van Straelen, Antwerp, Belgium.

TENTHREDINOIDEA.—Sawflies from all parts of Canada desired for study, with view to publication of catalogue. Material will be returned or exchanges made. W. HAGUE HARRINGTON, P. O. Dept., Ottawa.

WILL COLLECT any order this season in Pennsylvania and New Jersey, in exchange for Hymenoptera—unmounted. Wanted just as it comes from the field—especially Siricoidea, Tenthredinoidea, Ichneumonidea, and Evaniidae. J. CHESTER BRADLEY, 2221 Spring Garden St., Philadelphia, Pa.

WILL COLLECT in any order in exchange for Coleoptera and Lepidoptera (Noctuidae specially). CHARLES STEVENSON, 906 St. Urbain Street, Montreal, Que., Canada.

N. A. LEPIDOPTERA desired. Those willing to collect, in exchange for European specimens, please communicate with JAMES McDUNNOUGH, Kleist Str. 42, Berlin, Germany.

Have several recent books and pamphlets on N. Am. Hymenoptera which I would like to exchange for insects. Please write to G. CHAGNON, post-office box No. 186, Montreal, Can.

ARCTIANS.—Living eggs or larvæ of any North American moths of the genus *Arctia* wanted for purposes of studying preparatory stages. Will be glad to render help, if possible, as to wants of anyone assisting. ARTHUR GIBSON, Cent. Exp. Farm, Ottawa, Can.

BASSWOOD INSECTS.—The writer is making a special study of insects injurious to basswood (*Tilia*). Notes on insects found feeding on this tree will be acceptable.—ARTHUR GIBSON, Cent. Exp. Farm, Ottawa, Can.

LEPIDOPTERA.—*Papilio palamedes*, *Calephalis borealis* and many others to exchange. Would like to receive lists. JOHN & HURD COMSTOCK, 1572 Ridge Ave., Evanston, Illinois.

LEPIDOPTERA.—Pupæ and imagoes of nearly all N. Am. Sphingidae and imagoes of Arctians desired in exchange. HENRY ENGEL, P. O. Box 369, Pittsburg, Pa., U. S. A.

WANTED.—*Erycinidae* of the world. Also butterflies from the Western and North-western States. Offer Diurnes from Central and South America, in faultless condition. LEVI W. MENGEL, Boys' High School, Reading, Pa.

DIPTERA.—Wanted, as many *Asilina* as possible from all parts of North America. Write for particulars to PROF. C. H. FERNALD, Amherst, Mass.

WANTED.—Ants and Termites. Specimens and literature for exchanges. H. WOLFF, S. J., Canisius College Museum, Buffalo, N. Y.

LEPIDOPTERA.—Fine bred specimens of *Catocala illecta* and *minuta* for exchange. Also *Nathalis iole*, *Aneca andria*, etc. Want *Catocalæ*, butterflies and sphinges. G. M. DODGE, Louisiana, Mo.

WANTED.—American silk-producing Lepidoptera. Directions for the rearing of wild silkworms can be obtained from the author. For terms, address ALFRED WAILLY, Branksome, Upper King's Road, Kingston Hill, London, Eng.

FOR EXCHANGE.—Butterflies of this neighbourhood, for those not in my collection. Have also a number of chrysalids of *Feniseca tarquinius* for exchange. Address: WILMON NEWELL, Wooster, Ohio.

The Canadian Entomologist.

VOL. XXXIV.

LONDON, JUNE, 1902.

No. 6

CLASSIFICATION OF THE FOSSORIAL, PREDACEOUS AND PARASITIC WASPS, OR THE SUPERFAMILY VESPOIDEA.

BY WILLIAM H. ASHMEAD, A. M., ASSISTANT CURATOR, DIVISION OF INSECTS,
U. S. NATIONAL MUSEUM.

(Paper No. 5.—Continued from Vol. XXXIV., p. 88.)

SUBFAMILY IV.—Planicipinæ.

This subfamily comes nearest to the *Aporinæ*, and a few of the males are easily confused with and mistaken for some males in the latter group.

The head is, however, lenticular, very thin antero-posteriorly, the temples being very flat, while the antennæ are always placed much closer to the mouth, *on* or *below* an imaginary line drawn from the base of the eyes. These characters ought to enable the student to recognize readily a wasp falling in this group.

Some males in the subfamily *Aporinæ* have a lenticular head, but in these the antennæ are inserted *above* this imaginary line, never on or below it.

Two tribes may be recognized.

Table of Tribes.

- | | |
|--|------------------------|
| 1. Apterous..... | 3. |
| Winged. | |
| Front wings with <i>three</i> cubital cells..... | 2. |
| Front wings with <i>two</i> cubital cells. | |
| Clypeus short, not much produced; front legs in ♀ greatly swollen, with tarsal joints 2-4 short, transverse or nearly, in ♂ normal..... | Tribe I., Planicipini. |
| 2. Clypeus much produced, flat or at most only slightly convex, projecting over the mandibles; front legs in ♀ usually normal, more rarely much swollen..... | Tribe II., Homonotini. |

3. Clypeus flat, much produced anteriorly, covering the mandibles; front femora swollen.....Tribe II., Homonotini (pars).

Tribe I.—Planicepini.

Nothing seems to be known positively of the habits of any species belonging to this group.

I hope, therefore, that some of our students will endeavour during the present summer to ascertain the life-history of one or more of our species.

Table of Genera.

1. Second cubital cell longer than wide (or high).....2.
 Second cubital cell wider (or higher) than long.....3.
 2. Second cubital cell receiving *both* recurrent nerv-

ures.....Planiceps, Latreille.

(Type *Pompilus planiceps*, Latr.)

Second cubital cell receiving only *one* recurrent nervure—the first, the second joining the cubitus *beyond* the second transverse cubitus; pronotum with the hind margin arcuately emarginate; submedian cell in front wings longer than the median, in hind wings shorter.....Melanaporus, Ashm., g. nov.

(Type *Planiceps euferris*, Fox)

3. First and second cubital cells each receiving a recurrent nervure.....Hoploneurion, Kohl.

(Type *H. apagona*, Kohl.)

Tribe II.—Homonotini.

In this tribe the front wings have *three* distinct cubital cells, while the clypeus is flat or, at most, sub-convex, and produced anteriorly so as to cover the mandibles.

A single wingless genus is known, *Apteropompilus*, Brauns, recently discovered in Africa. It has the structural characters of other genera placed here, except in being without wings. I have not had a specimen for examination, but structurally it seems to come very close to *Pedinaspis*, Kohl, and I suspect it may ultimately prove to be a wingless species belonging to that genus.

Meracus, Tournier, judging alone from the description, is evidently synonymous with *Pedinaspis*, Kohl.

Table of Genera.

1. Winged.....2.
 Wingless.

Mesonotum very long ; front femora rather long and swollen, the tibia stout ; claws with one tooth

beneath.....Apteropompilus, Brauns.

(Type A. tosquineti, Brauns.)

2. Wings normal, when closed extending beyond the tip of the abdomen.....6.
Wings more or less abbreviated, when closed *not* extending beyond the tip of the abdomen, especially in the females, in ♂ usually of normal length.....3.
3. Mesosternum emarginate at the middle; second and third cubital cells very unequal, the third much the larger; cubitus in hind wings originating *beyond* the transverse median nervure; claws with a tooth near the middle beneath.....5.
Mesosternum not emarginate at the middle; second and third cubital cells large, nearly equal; claws with a strong tooth at middle beneath.....4.
4. Transverse median nervure in front wings interstitial with the basal nervure; cubitus in hind wings variable, usually originating *beyond* the transverse median; clypeus separated at base by a delicate sutural line; body not entirely black.....Parapompilus, Smith.
= Micropteryx, Lepel.
(Type Pompilus brevipennis, Fabr.)
Transverse median nervure in front wings *not* distinctly interstitial, the submedian cell a little longer than the median; cubitus in hind wings originating *beyond* the transverse median nervure; clypeus very flat, polished and not separated at base by a delicate sutural line; body entirely black or blue-black.....Pedinaspis, Kohl (pars.).
5. Eyes bare; hind tibiæ *not* spinous, pubescent, and not or scarcely longer than the tibiæ; transverse median nervure in front wings interstitial with the basal nervure.....Epipompilus, Kohl.
(Type Ferreola azteca, Cress.)
= E. Maximiliani, Kohl.
Eyes pubescent; hind tibiæ unarmed; front femora rather stout, the tarsal joints 2-4 short, not longer than thick. (♂ unknown.) (Peru.).....Aulocostethus, Ashm., g. nov.
(Type A. bifasciatus, Ashm., MS.)
6. Metathorax posteriorly obliquely truncate, impressed, the angles more or less acute.....7.

Metathorax flat, feebly rounded behind; scape as long as the first joint of the flagellum; clypeus rounded. *Ceropalioides*, Radoszk
(Type *C. Komarousii*, Radoszk.)

7. Scape cylindrical, neither subcompressed nor longer than the pedicel and first joint of the flagellum united; clypeus flat, clothed with a silvery pubescence; pronotum not longer than the mesonotum. 8.
Scape subcompressed, longer than the pedicel and first joint of the flagellum united; clypeus very flat, not separated at base by a delicate line; pronotum distinctly longer than the mesonotum.

Submedian cell in front wings a little longer than the median, the second and third cubital cells subequal, the cubitus in the hind wings originating *beyond* the transverse median nervure. *Pedinaspis*, Kohl.

(Type *Pompilus operculatus*, Kirby.)

8. Metathorax a little longer than wide, semicircularly impressed or emarginate posteriorly, but *without* a median impressed longitudinal line, the hind angles more or less acute; second cubital cell usually a little longer than the third or subequal; first joint of flagellum in ♀ as long as the second, in ♂ shorter. *Wesmaelinus*, Costa.

(Type *Sphex sanguinolentus*, Fabr.)

Metathorax not longer than wide, impressed posteriorly, but also with a distinct median longitudinal impressed line; body clothed with a silvery pubescence; second cubital cell smaller than the third; first joint of flagellum in ♂ as long as the second. *Homonotus*, Dahlbom.

(Type *H. fusciventris*, Dahlb.)

SUBFAMILY V.—Notocyphinae.

This subfamily is quite distinct from all others, and is easily recognized by the characters made use of in my table of subfamilies, the large free labrum being found in no other group except the *Ceropalinae*; but from that group it is distinguished by the long pronotum, the curved, not straight, antennae, and by the non-emarginate eyes. The antennae are inserted some distance above the clypeus.

The habits of the group are unknown. I suspect, however, that, like the *Ceropalinae*, the species are either parasitic or inquilinous in the nests of other wasps, the *Pepsinae* and the *Aporinae*, for the structural characters of these wasps clearly show that they have different habits from those in the other subfamilies.

I have placed in this subfamily the very rare genus *Chirodamus*, Haliday, discovered by Charles Darwin, in South America, during his memorable voyage in the Beagle.

It was unknown to Kohl, while Dr. von Dalla Torre, evidently without an examination of a specimen, has placed it, in his *Catalogus Hymenopterorum*, as a synonym of *Pompilus*, Fabr.

Fortunately, I have recognized this rare genus among some material collected in 1888 by the U. S. Fish Commission steamer, Albatross, in South America, in the same locality, Strait of Magellan, in which Darwin took his single specimen 87 years ago.

The U. S. Fish Commission took three perfect specimens, and this seems to be the first time it has been taken since the single specimen taken by Darwin.

Table of Tribes.

1. Wings extending to or beyond the tip of the abdomen, the cubitus in hind wings originating *before* the transverse median nervure 2.
Wings somewhat abbreviated, hardly extending to the tip of the abdomen, the cubitus in hind wings interstitial with the transverse median nervure.
Eyes not extending to the base of the mandibles, a wide space between; front femora *abnormally* swollen, with fascicles of hairs beneath, the tarsi short Tribe I., Chirodamini.
2. Eyes long, extending to the base of the mandibles or very nearly, at most with only a linear space between; front femora normal, not much swollen, the tarsi long Tribe II., Notocyphini.

Tribe I.—Chirodamini.

To this tribe belongs but a single genus—*Chirodamus*, Haliday. It may be recognized by the characters made use of in defining the tribe, but I add a few more :

Labrum prominent, subconvex, semicircular, front tarsal joints 2-4 very short; the hind tarsi very long, much longer than their tibiae, mandibles long, pointed, edentate; scape of antennae stout, as long as the first joint of the flagellum; prothorax rather long and wide; metathorax short, truncate posteriorly; claws with a median tooth beneath, ciliate; maxillary palpi 6-, labial palpi 4-jointed *Chirodamus*, Haliday.

(Type C. Kingii, Haliday.)

Tribe II.—Notocyphini.

Differs from the *Chirodamini* by the different shaped head, the long eyes, which extend to or nearly to the base of the mandibles, by the long tarsi, by the slenderer anterior femora, and by the different venation of the wings.

In the insertion of the antennæ the group comes nearest to the *Aporinæ*, to which it is unquestionably closely allied, but from that group it is at once separated by the prominent, free labrum and by the absence of a tarsal comb in the females.

The group is evidently parasitic, and possibly some of the genera defined in the *Aporinæ*, without a tarsal comb, will ultimately be removed to this tribe.

Table of Genera.

1. Third cubital cell very large, and along the cubitus very long, longer than the second ; labrum long, trapezoidal, much longer than wide ;
♂ antennæ normal..... Notocyphus, Smith.
(Type *N. laevissimus*, Smith.)

Third cubital cell triangular, smaller than the second ; labrum semi-circular, wider than long ; ♂ antennæ
crenulate..... Allocyphonyx, Ashmead, g. nov.
(Type *Pompilus maurus*, Cresson.)

SUBFAMILY VI.—Ceropalinae.

The Russian hymenopterologist, Gen. O. Radoszkowsky, was the first to correctly define the group. He called it a family in 1888.

In 1894, Mr. Wm. J. Fox, of the Philadelphia Academy of Sciences, probably from ideas derived from Radoszkowsky, treated it as a tribe.

It is unquestionably a natural group, differing in habits and many salient characteristics from all of the groups here recognized. The emarginate eyes, free labrum, straight antennæ, short pronotum, etc., as well as the characters of the male genitalia, as figured by Radoszkowsky, readily distinguish the group.

The species are parasitic in the nests of other Ceropalids or Pompilids. Benjamin D. Walsh was the first to demonstrate the parasitic

habits of these wasps. In June, 1868, he bred *Ceropales rufiventris*, Walsh, from the mud cells of *Agenia bombycina*, Cresson.

Table of Genera.

1. Cubitus in hind wings originating *before* the transverse median nervure 2.
 Cubitus in hind wings originating *behind* the transverse median nervure..... 3.
2. Metathorax posteriorly rounded, not obliquely truncate; clypeus anteriorly subarcuate; submedian cell in front wings *shorter* than the median; pronotum with the hind margin angularly emarginate..... *Agenioxenus*, Ashm., g. nov.
 (Type *Ceropales rufiventris*, Walsh.)
3. Metathorax posteriorly obliquely truncate or depressed; clypeus anteriorly truncate; submedian cell in front wings never shorter than the median; pronotum with the hind margin arcuate or arcuately emarginate, not angularly emarginate.. *Ceropales*, Latreille.
 (Type *C. maculatus*, Latr.)

ENTOMOLOGICAL RECORD.

An interesting contribution by Dr. Fletcher, entitled "Entomological Record, 1901," has just appeared in the 32nd Annual Report of the Entomological Society of Ontario. This, besides giving a list of the active workers in Canada, includes careful notes on rarities, etc., taken during the year. It is the intention of the Society to continue this Record from year to year, and as this will undoubtedly prove useful to entomologists throughout Canada, it is hoped that collectors in the Dominion will try to make it as complete as possible. Records of interesting specimens captured, either from the standpoint of distribution or rarity, will be acceptable, and should be sent to Dr. James Fletcher, Central Experimental Farm, Ottawa. Specimens unknown to collectors will gladly be identified.

NEW DIURNAL LEPIDOPTERA FROM BOLIVIA.

BY A. G. WEEKS, JR., BOSTON, MASS.

*(Continued from Vol. XXXIII., page 324.)**Pamphila barbara*, sp. nov.

Habitat: Bolivia. Expanse: 1 12 inches.

Head, thorax and abdomen above, dark brown; below, gray. Antennæ dark brown, with white annulations at base of each joint. Club brown, white near base.

General colour of upper surface blackish brown. Hind marginal fringe of ground colour.

Upper side of fore wing has an indistinct white dot in apical area. Near centre of wing, under the end of discoidal space, are two prominent white dots, the upper being under median, the other being in next lower interspace, larger than the first and somewhat nearer base.

Upper side of hind wing without markings.

The hind marginal fringe of lower side of fore wing tends to grayish with a white thread. The ground colour is dead blackish brown. The costal area and apex are gray somewhat tinged with blue. There are three subcostal white dots. The gray apical area is crossed by a series of dots of the ground colour, parallel to hind margin and one-sixteenth inch within it. The inner marginal area tends to grayish. The rest of the wing is of ground colour, the two prominent white spots of upper side being repeated.

Under side of hind wing is gray, or, perhaps, dark brown, very heavily dusted with gray scales. Across the centre of the wing, running from centre of costa across to centre of hind margin and following contour of hind margin, is a series of six interspacial bluish marks of considerable prominence and bordered with a dark thread. The one bordering the end of discoidal space has a distinct black border at its basal side, giving the appearance of a black mark in centre of wing. The hind margin has a band of the same blue shade, one-sixteenth inch wide and edged on both sides by a blackish brown thread. Inner marginal area is gray and not encroached upon by dark markings. Hind marginal fringe gray, showing darker at ends of nervures.

Described from one specimen taken five days' travel north from Cochabamba, September 12, 1899.

NOTES ON THE EARLY STAGES OF CORETHRA
BRAKELEYI, Coq.

BY JOHN B. SMITH, SC. D.

On June 1st, 1901, while on a mosquito hunt with Mr. J. Turner Brakeley, at Lahaway, we investigated the little pools around the head of a swamp spring. The water was very cold, and our object was, mainly, to ascertain whether *Aedes* larvæ occurred in such localities, where pitcher plants were in the vicinity.

In the course of our dipping I found a very odd little wriggler, altogether different from anything I had ever seen before, and soon Mr. Brakeley found the same thing. We took only a few of them at that time, and from their minute size I assumed they must be very young. I afterward sent a specimen to Dr. Howard, and he appeared as much at sea concerning its location as I was. It seemed to be a Culicid larva, without much doubt; but that was as far as we could get. The specimens were about an eighth of an inch in length, light reddish in colour, and very hairy in appearance. The head was very broad, and from it the body tapered gradually to the short obtuse anal siphon. Mr. Brakeley christened them "bull-heads," and I called them "triangles." They were kept alive a short time only, and during that period proved very sluggish.

July 27th, Mr. Brakeley was at Lahaway, and put in an hour dipping for mosquito larvæ in a lily pond at the foot of the garden. The pond is full of fish, but in the grassy shallows around the edge Culicids breed to a limited extent. Here he struck a little nest of the "bull-heads," and secured two dozen, which he carried to his town house in Bordentown. The little creatures remained almost motionless for hours, some at the surface, some below it at various points. Some had the anal siphon at the surface and the head a little below, the position being intermediate between that assumed by *Anopheles* and that assumed by *Culex*. Two of these little larvæ pupated on July 28th and others on the 29th, 30th, and 31st. On August 1st I went to Bordentown and took charge of the culture, expecting to get out almost anything rather than a Culicid.

The pupa was just as odd as the larva, and reminded me of a *Lycænid* chrysalis with a pair of breathing tubes. These pupæ were at the surface, and seemed to have little power of motion. They were easily submerged and easily drowned. Though I was as careful as I could well be, the jarring between Bordentown and New Brunswick meant death to several of them.

The first adult emerged August 2nd, a period of $4\frac{1}{2}$ days from the first pupation, and this proved to be very close to the average period.

The insect was a male, very pretty, and utterly unknown to me; certainly not a long-billed mosquito. Mr. C. W. Johnson, to whom I submitted a specimen, made it Culicid on venation, but could not identify it with any described form.

Later Mr. Coquillett pronounced it a new species of *Corethra*, and, at my request, named it *Brakeleyi*, the description appearing in a recent number of the *Entomological News*.

August 13th, Mr. Brakeley sent me another lot of the larvæ, taken at the same place as the last lot, and stated that some very minute examples occurred, evidently babes.

Other collections were made September 17th, October 14th and October 20th. The latter was made after a heavy frost (min. 21° on the bog close by), and in each case half-grown to full-grown examples were found. No pupæ were found with the larvæ at any time, and no adults were collected.

The life-history is very imperfect: the egg stage is not known, nor the duration of the larval stage. We know that the larva occurs very late in the fall and quite early in spring, and I am inclined to believe that hibernation is in the larval stage; but I have no proof more positive than I have stated.

The larva was submitted to Dr. Dyar, who separates it from all other Culicid larva because it has the antennæ arising from the dorsal aspect of the head, close together, above the mouth. There is no mouth brush, the eyes are rounded, and the abdominal hairs are unequal.

The pupa is brown in colour, and floats parallel to the surface, with the long slender air tubes slightly projecting. It is entirely different from that of any other Culicid known to me.

The adult has mouth-parts similar to those of some Simuliids that I have seen; but I have not yet studied them closely.

The larva of this species is not in the least like the descriptions or figures of *Corethra* heretofore published, nor does it accord in any way with what Theobald says of the early stages of this genus. It agrees much better with *Mochlonyx*, except for the unusual position of the antennæ; but in the pupal stage it is utterly and completely unlike any other Culicid known to me or described by Theobald.

Based upon the early stages, *Corethra Brakeleyi* should form a distinct generic type.

NOTES ON SOME SOUTHERN CALIFORNIAN ORTHOPTERA.

BY JAMES A. G. REHN, PHILADELPHIA.

The following specimens were collected at San Diego, California, during the year 1901 by Mr. G. W. Dunn, and are now in the collection of the Academy of Natural Sciences of Philadelphia. The terms used in the descriptions, are those adopted by Comstock and Kellogg in their recent work, "Elements of Insect Anatomy."

Family MANTIDÆ.

LITANEUTRIA OBSCURA. Scudder.

One immature male, November 13, 1901.

Family PHASMIDÆ.

SERMYLE ARBUSCULA.* n. sp.

Type, ♀; San Diego, California, May 7, 1901.

This species does not seem to be very closely related to any of the previously-known species of the genus. From *asteca*, Saussure, it is differentiated by having the femora carinate and striate; from *Saussurii*, Stal, by the non-ampliate sixth abdominal segment; and from *strigata*, Scudder, by the more robust limbs and the less strongly striate body. With *Mexicana* and *linearis*, Saussure, no affinity exists.

General form slender, the thoracic portion rather robust. Head rather elongate, bearing two central longitudinal rugæ, which become obscure caudad, the whole surface of the head rather tuberculate, the tubercles being longitudinally disposed; eyes subspherical, slightly exserted; antennæ longer than cephalic femora, the proximal segment large and broad, with the distal section contracted, this segment over twice as large in bulk as the next. Pronotum, mesonotum and metanotum tuberculate, the tubercles resolving into longitudinal series, this being more apparent on the metanotum, the mesonotum and metanotum being centrally carinate; pronotum rather narrow, not quite equalling the head in length; mesonotum long (with pronotum equalling the cephalic femora), the lateral margins slightly tuberculate; metanotum very considerably shorter than the mesonotum, comparatively robust, expanding in the caudal portion. Abdomen rather slender, multistrigate, none of the segments exhibiting any special ampliation; ventral surface between the sixth and seventh segments exhibiting a pair of flattened longitudinal processes. Cephalic femora heavy, with the proximal diastema (found in

*In relation to the twig-like appearance of the insect.

many representatives of this family) rather well marked, the remaining section of the segment being inflated and with three prominent angles; tibiæ as long as the femora, quadrate, slightly tapering; first tarsal joint about as long as the succeeding ones. Intermediate femora short, triangular in section, equalling the metanotum (and median segment) in length; tibiæ depressed, about equalling the femora in length; first tarsal joint considerably less than the succeeding joints in length. Caudal femora short, reaching the middle of the third abdominal segment, roughly triangular in section; tibiæ rather longer, reaching to the apex of the first segment. General colour reddish brown, washed with ashy gray on the cephalic limbs.

Measurements:

Length of body.....	54 mm.
Length of pronotum....	3 "
Length of mesonotum.....	12 "
Length of metanotum (with median segment).	8.7 "
Length of abdomen.....	28 "
Length of cephalic femora	14 "
Length of intermediate femora.....	7.5 "
Length of caudal femora.....	8.7 "

Family ACRIDIDÆ.

ARPHIA RAMONA, n. sp.

Types: ♂ and ♀; San Diego, California, April 4 (♂) and 30 (♀), 1901.

Allied to *A. Behrensi*, Saussure, but much larger, with the pronotal carinæ slightly arcuate and very slightly incised; the frontal costa is suddenly constricted superiorly and not tapering, while the posterior margin of the pronotum is rectangulate, with the angles more or less rounded instead of acute angulate. With *nietanna*, Saussure, the species needs no comparison.

♂. Size rather small. Head with the fastigium gently rounded, merging into the frontal costa with a slightly perceptible angle; vertex decidedly longer than broad, rather deeply excavated, the lateral margins subacuminate cephalad; frontal costa decidedly constricted dorsad, rather broad ventrad, slightly expanded at the ocellus, the dorsad section bearing a central low ridge, broadly sulcate at and ventrad to the ocellus; eyes sub-elliptical, equal to the ventro-ocular portion of the genæ; antennæ short, slightly expanded distad. Pronotum rugose, moderately

expanded caudad; cephalic margin obtuse-angulate, caudal margin rectangulate; median carina rather low, slightly arcuate, very slightly incised; lateral lobes subquadrate, rugose on the metagonal portion, cephalic and caudal margins parallel, ventral margin obtusely trimmed cephalad. Tegmina rather long, considerably exceeding the hind femora, broadly rounded proximad. Posterior femora stout, with prominent dorsal and ventral keels.

General colour blackish-brown, the dorsal aspect of the tegmina with a longitudinal bar of brownish ochraceous; abdomen dull yellow; posterior tibiæ deep cobalt blue, with a lighter subproximal ring, spines black.

♀. Size large. Head with the vertex cordiform, the cephalic portion completely closed; frontal costa considerably constricted superiorly, subequal at and below the ocellus, supplementary intermediate ridge subobsolete; eyes elliptical, considerably shorter than the ventro-ocular portion of the genæ; antennæ moderately long, slightly expanded distad. Pronotum essentially as in the male. Tegmina rather long, slightly exceeding the body, considerably exceeding the hind femora. Wings rather large, equal to the tegmina in length.

General colour grayish brown, the tegmina sprinkled with spots of darker brown, giving a "salt-and-pepper" appearance to the latter parts; outer face of the posterior femora obscurely washed with hoary; posterior tibiæ ultramarine blue with a sub-proximal ring of dull pinkish, the spines black. Wings with the disc and the greater part of the cephalic margin reddish orange, the ulnar stigma and the periphery dull blackish brown, the distal portion of the humeral field smoky hyaline.

Measurements:	♂.	♀.
Length of body.....	22.5 mm.	37.5 mm.
Length of pronotum.....	5 "	7.5 "
Length of tegmina.....	22 "	32 "
Length of hind femora.....	13 "	19 "

The total number of specimens of this species examined was eleven—four males, seven females.

ARPHIA HESPERIPHILA, n. sp.

Types: ♂ and ♀; San Diego, California, April 4 and October 30, 1901.

Allied to *A. arcta* and *A. conspersa*, Scudder, but distinguished from the former by the higher pronotal crest, by the more robust posterior femora, the shorter ulnar stigma, and the more definite wing arc; from

conspersa it is distinguished by the sub-rotundate vertex, the more uniformly-coloured pronotum, and the colour of the disc of the wings and of the hind femora.

♂. Size very small (for this genus). Head rugulose; vertex elongate, rather deeply excavated, fastigium foveolate; frontal costa constricted dorsad, gently expanded ventrad, shallowly sulcate in the vicinity of the ocellus; eyes slightly prominent, elliptical, not equalling the ventro-ocular portion of the genæ; antennæ short, distal section gradually enlarged. Pronotum rugose on the prozona, punctate on the metazona, slightly constricted centrally; cephalic margin finely obtuse-angulate, caudal margin rectangulate; median carina moderately high, arcuate on the prozona, narrowly cut by the transverse sulcus; lateral carina marked in the metazona, obscure and sinuous on the prozona; lateral lobes deep, the ventral margin sinuate cephalad. Tegmina rather long, distal extremity truncate. Caudal femora heavy, genicular region only slightly enlarged. General colour wood brown, varied and sprinkled with black; the distal portion of the tegmina black, which tint also suffuses the pleuræ and genicular lobes and outer face of the caudal femora; caudal tibiæ ultramarine blue, the genicular portion black, the usual proximal ring greenish white.

♀. Size small. Head with the fastigium shallowly foveolate; frontal costa expanded at the ocellus, shallowly sulcate in the portion cephalad to this point; eyes rather small, considerably smaller than the infra-ocular portion of the genæ. Pronotum with cephalic margin of the lateral lobes subarcuate.

General colour wood brown, the genicular portion of the caudal femora suffused with blackish, which tint also forms several indistinct transverse bars on the tegmina. Wings with the disc sulphur yellow; the arc pale blackish brown, not evanescent and not reaching completely around the caudal margin of the wing or to the anterior margin, stigma short, cephalic margin obscurely with blackish brown distad, proximal area (except the above-mentioned margin) hyaline.

Measurements:	♂.	♀.
Length of body	14 mm.	22.5 mm.
Length of pronotum	3.5 "	4.7 "
Length of tegmina	16 "	19.5 "
Length of hind femora	9.5 "	11.5 "

Five specimens examined, two males, three females.

CHIMAROCEPHALA PACIFICA (Thomas).

Three females ; March 23 and 24, and April 10, 1901.

STICTHIPPIUS CALIFORNICUS (Scudder).

Two females ; June 14 and August 13, 1901.

An examination of these two specimens shows that *marmosatus*, Scudder (Psyche, VI., p. 318), is probably only a variation of this form, one of the specimens having the anal vein free on one tegmen and entangled on the other, this character being used by Scudder as a differential one, while the maculations of the tegmina seem of no greater value.

SPHARAGEMON VENUSTUM (Stal).

Four males and three females; May 18, 20, 25 and 28, and June 5, 1901.

These specimens have the hind tibiæ glaucous or dull lutescent instead of blue.

DEROTMEMA SAUSSUREANUM, Scudder.

One immature female and one male ; July 17, 1901.

CONOZOA BEHRENSI, Saussure.

Six specimens : four males, two females ; September 22 and October 3, 1901.

TRIMEROTROPIS REBELLIS (Saussure).

Trimerotropis cristata, Rehn (not of McNeill), Trans. Amer. Ent. Soc., XXVII., p. 333.

Four specimens : three males, one female ; April 14 and May 18 and 28, 1901.

TRIMEROTROPIS VINCULATA, Scudder.

Twenty-nine specimens : ten males, 19 females ; March 23, April 4, 11, 17, 22 and 30, May 9, 15, 18, 25, 28 and 31, June 5, July 25, and October 22 and 30, 1901.

HELIASTUS CALIFORNICUS (Thomas).

One female ; March 29, 1901.

DRACOTETTIX MONSTROSUS, Bruner (?).

One immature female ; May 4, 1901.

This specimen differs somewhat from Bruner's figure of *D. monstrosus* (Proc. U. S. Nat. Mus., XII., pl. 1, fig. 1), mainly in the form

of the lobes of the median carina and of the lower part of the face. As the specimen is immature, these differences may be those of immaturity. No relationship exists with *D. plutonius*, Bruner (North Amer. Fauna No. 7, p. 267).

SCHISTOCERCA VAGA (Scudder).

Two females ; April 24 and July 17, 1901.

ÆOLOPLUS CHENOPODII ARCUATUS, n. subsp.

Type: ♂ and ♀ ; San Diego, California, May 18 and 28, 1901.

Very closely allied to *Æ. chenopodii* from Grand Mesa, Colorado, but differing in the rotundate caudal margin of the subgenital plate, this region in *chenopodii* being acuminate (see Scudder, Proc. U. S. Nat Mus., XX., pl. V., fig. 9), and in the more apparent prozonal median carina, this section being "wanting or rarely indicated" in *chenopodii*.

Size medium. Pronotum with the pronotal carina quite distinct, except on the caudal portion of the prozona, where it is obsolete. Subgenital plate of the male with the caudal margin rotundate ; cerci tapering to a very fine point.

Colour apparently the same as true *chenopodii*.

Measurements :	♂.	♀.
Length of head and body	15.5 mm.	22 mm.
Length of pronotum	4.2 "	6 "
Length of tegmina	4.2 "	5.5 "
Length of posterior femora	11.5 "	14 "

Four specimens of this species have been examined: two males, two females.

MELANOPLUS RILEYANUS, Scudder.

One female ; April 10, 1901.

Family TETTIGONIDÆ.

CONOCEPHALUS MEXICANUS, Saussure.

One female ; May 13, 1901.

Family GRYLLIDÆ.

GRYLLUS ASSIMILIS (Fabricius).

One male ; July 28, 1901.

This is much smaller than Mexican specimens of *assimilis*, but it is clearly the same species.

SOME NEW NORTH AMERICAN FULGORIDÆ.

BY E. D. BALL, FORT COLLINS, COLORADO.

Some time ago, when about to publish a synopsis of the genus *Scolops*, the writer discovered that Dr. Uhler had the same genus in hand and his MSS. ready for the press. As the result of the correspondence, the writer dropped his work for the time, and Dr. Uhler promised to send his types as soon as his paper was published. (Proc. Md. Acad. Sc., p. 401, 1900.) With his usual thoughtfulness, the Doctor sent on the types, and with the aid of these and a fine series of eastern forms received from Mr. Otto Heidemann the author has been able to definitely place all the described species and recognize a number of new ones.

The genus is found in its greatest abundance in the border line of plain and mountain region, and so many new forms have been found here in the past few years that there are no doubt many more to be found on further search.

All but one or two of the species have been found to occur in two wing lengths; one in which the elytra are about the length of the abdomen and the under wings very short and probably not functional; the other in which the elytra are long and flaring, the wings well developed.

On account of the curved or angled nature of the cephalic process, the measurement of its length is a somewhat difficult matter. In the present paper the length given has been measured in a straight line from the tip to the middle of the eye.

Scolops Osborni, n. sp.

Form and structure of *sulcipes*, but larger and with a stouter process. Colour pale yellow as in the lighter species of *hesperius*. Elytra light, sparsely dotted with fuscous. Length: macropterous examples 11 mm., brachypterous 9 mm.; length of horn 3 mm.; width 4 mm.

Cephalic process long and slightly bent at the sulcus, larger than in *sulcipes* and not constricted beyond the sulcus, as large as that of *hesperius*, but regularly tapering anteriorly. Elytra with the two inner nervures of corium forked well before the middle and one branch at least of each again forked before the apex of clavus, cross nervures not as numerous as in *sulcipes* and very faint except at apex.

Colour: cephalic process and face yellow, pronotum and scutellum straw colour, a pair of pitchy black spots on the sides of the pronotum

just back of the eyes, which they exceed in diameter; a pair of dots on the disc and four black dots on posterior margin of scutellum. Elytra pale, the nervures concolorous, margined with regularly-arranged pairs of black dots, the costal and apical margins with large quadrate black spots; cross nervures, except at apex, unmarked.

Described from seven specimens; three from Sioux City, Iowa (Osborn); three from Onaga, Kans. (Crevecœur), and one from Effingham, Kans. (Van Dúzee). The double furcation of the nervures will separate this from any but *sulcipes*, and the larger process and the lighter colour will readily differentiate it from this latter species.

Scolops Uhleri, n. sp.

Resembling *angustatus* and *perdix*, but much shorter-bodied and with a long straight process. Length 6.5–8 mm., process 2–3 mm.; width 2.5 mm.

Cephalic process long and straight, half longer than front, parallel margined, two-thirds the width of the vertex, vertex convex. Elytra straight and narrow as in *angustatus*, but much shorter, the middle sector forking farther back than the inner one.

Colour: face and apical process pale soiled yellow, the lateral margins of the latter dull brown, pronotum and scutellum pale, more or less clouded, a pair of rather large round spots on disc of pronotum and another pair near apex of scutellum. Elytra with the broad outer margin and most of the inner margin pale or milky white; just inside the outer sector is a broad smoky or dark brown stripe, very definite on the outer margin and fading out internally. This stripe is sparsely interrupted with light dots on the nervures.

Described from twenty-four examples from Grand Junction, Colo. The small, square-set body, together with the remarkably long, straight process, renders this a strikingly distinct form. The process is twice as long as in *angustatus* and considerably longer than in *perdix*. It is also stouter and strictly parallel-margined, while in those species it tapers.

Scolops maculosus, n. sp.

Form of *Uhleri* nearly, body distinctly oval, the process shorter and stouter, resembling *robustus* in shape and colour, but smaller. Length: ♀ 7 mm., ♂ 6 mm., process 2 mm.; width 2.75 mm.

Cephalic process stout, almost as wide as the vertex, a trifle enlarged at the apex, as long as the front, slightly curved upward. Elytra

rounding, but little longer than body, two inner sectors of corium usually forking together and about opposite where the claval nervures unite.

Colour: face and lower surface of process pale yellow, rest of process, except dorsal carinæ, deep brown. Pronotum and scutellum irregularly clouded, a pair of spots, each, on vertex, pronotum and scutellum. Tegulæ with the disc black. Elytra pale, the costal margins broadly light, rest of elytra with rather large light and dark spots along the nervures, usually a very definite light spot just before the forking of the ulnar nervures.

Described from twenty-four specimens, all from Colorado, where it is very generally distributed.

Scolops viridis, n. sp.

Form of *angustatus* nearly, but broader, as broad as *perdix*. Green, with pale smoky spots on elytra. Length: ♀ 8 mm., ♂ 7 mm., process 2 mm.; width 3.5 mm.

Cephalic process small, straight, parallel-margined, slightly longer than front, less than half the width of the broad vertex. Elytra rather broad, longer than body, the normal form very long and flaring in macropterous examples, two inner sectors forking just back of middle of elytra, the middle one usually a trifle in advance of the other.

Colour: light green, a pair of black spots on each, pronotum and scutellum. Elytra with a rather narrow light stripe on costal margin, the nervures bright green, alternately interrupted with light and margined with pale smoky yellow.

Described from twenty-four specimens from Grand Junction and Pueblo, Colo. The green colour renders this quite distinct and introduces a new feature into the genus.

Scolops abnormis, n. sp.

Form and general appearance of *grossus*, slightly lighter coloured and with a larger process and simpler venation. Length 8 mm., width 3.5 mm., process 3 mm.

Cephalic process upturned, much inflated, slightly wider than the vertex or the front between the eyes, median carinæ of front becoming obsolete on process, lateral carinæ slightly widening and dividing the width into three equal parts, process slightly longer than front, the sulcus indistinct, eyes rather prominent, head definitely constricted back of eyes so that they are remote from pronotum. Elytra moderately long, somewhat flaring behind, the middle sector simple.

Colour: cephalic process brown with small light maculations, the lower face between the carinæ and the front pale. Body and elytra pale gray, a pair of black spots on scutellum and more or less of brownish maculation on pronotum and elytral nervures.

Described from two specimens from San Jose, Calif. (King). The immense size of the process will at once separate this from *pallidus*, which it resembles in venation and colour.

Scolops Vanduzeei, n. sp.

Form of *maculosus* nearly, but larger, resembling *abnormis*, but with much smaller process. Rusty straw-coloured. Length 7 mm., width 2.75 mm., process 2 mm.

Cephalic process not quite as wide as vertex, as long as front, strictly parallel-margined, lateral carinæ of lower face parallel, not enclosing over one-third of its width, head not constricted behind the eyes. Elytra longer than the body and well rounded behind, resembling *hesperius*, venation distinct, veins strong, middle sector usually forked slightly behind the inner one.

Colour: process mottled with fuscous and pale shading out to greenish fuscous on face, vertex with a fuscous crescent interrupted by the median carinæ, four fuscous spots in a transverse row on the pronotum and four more on the scutellum. Elytra pale smoky or grayish, the nervures light with light spots sparsely sprinkled along them, almost continuously margined with fuscous.

Described from eight examples from Kimball, Neb.

Scolops robustus, n. sp.

Resembling *maculosus*, but broader, stouter and with a cephalic process like *angustatus*. Length: ♀ 6 mm., ♂ 5.5 mm.; width 3 mm., process 1.25 mm.

Cephalic process very small and short, shorter than front, not over one-half the width of vertex, parallel-margined, vertex and eyes short and broad, head slightly constricted behind eyes, pronotum very short and broad, which gives the whole insect a broad, square-set appearance. Elytra either broad and square-set or very long and flaring, the middle sector usually forking slightly behind the inner one.

Colour: process greenish or smoky, the carinæ pale, vertex with a pair of small fuscous points, pronotum distinctly lighter, appearing as a light "collar," a pair of large round spots on disc, a pair of smaller points

against the carinæ outside, black. Tegulæ smoky brown, scutellum brownish or pale, with four large fuscous spots. Elytra milky white, clouded with brown along the light-dotted nervures, a pair of slightly oblique fuscous stripes towards the apex in the long-winged examples.

Described from twenty-four examples from various points in Colorado. Readily separated from all other species by the broad form and short process.

Cixius cultus, n. sp.

Resembling *stigmatus* without basal band, smaller and narrower. Narrower than *pini*, with a longer vertex. Length: ♀ 6.75 mm., ♂ 5 mm.; width 2 mm. Vertex longer than breadth at base, acutely triangular at apex, with the bounding carinæ distinct, apex distinctly overhanging front. Front rather narrow, enlarged over the antennæ beyond the line of the marginal curve, median and lateral carinæ distinct as in *colapeum*. Elytra very long and narrow, parallel-margined.

Colour: black, the carinæ of front and vertex, all the pronotum except the area behind the eyes, the tegulæ and the carinæ of scutellum, light. Sometimes the carinæ on front and scutellum are reddish. Elytra milky, sometimes slightly clouded with smoky and with a pair of smoky spots before the middle and another faint one inside the stigma. Stigma small and oblique.

Male pygofers short, with the posterior margin deeply notched, the apex of the notch with a short tooth. Styles about equalling the pygofers, slender at base, broadening out into a slipper-shaped apex, with the toe out. Anal tube without teeth below. Entire genitalia black.

Described from ten specimens from Calif., two from Kans. and nine from Colo. The elongate vertex and narrow form will readily separate this from any other described species.

Oliarus aridus, n. sp.

Resembling *panzeri*, but more elongate, as large as *5-lineatus*, but with longer and narrower elytra. Length: ♀ 7.25 mm., ♂ 6.5 mm.; width 3 mm.

Vertex shorter and broader than in *5-lineatus*, but little longer than wide, parallel-margined on posterior half, then rounding to a blunt apex, posterior margin angularly notched, face much broader than in *5-lineatus*, nearly flat transversely, with distinct carinæ. Elytra long and narrow, with a rather small stigma.

Colour: vertex fuscous, the carinæ light yellow, a definite light spot on the carinæ against the eyes, face testaceous, the carinæ slightly lighter, a larger light spot on each side below the antennæ. Pronotum dark, the carinæ and margins broadly light, scutellum testaceous, a dark stripe outside the carinæ. Elytra milky or hyaline, nervures very lightly marked, stigma and cross nervures fuscous.

Male pygofers long, ventral notch rather shallow, with a slender tooth, lateral margins of pygofers produced into a pair of teeth. Styles extending half their length beyond the pygofers, their inner margins appressed, narrow, nearly cylindrical at base, the apical half broad and obliquely truncate, together spear-shaped. Pygofers black, the posterior margins, tooth and styles, yellow.

Described from twenty-four specimens from Kans., Calif., and various parts of Colo.

Oliarus complectus, n. sp.

Form and general appearance of *aridus*, but much smaller. Smaller and narrower than *humilis*. Length: ♀ 5.5 mm., ♂ 4.5 mm.; width 1.75 mm.

Vertex nearly half longer than broad, narrowing from the base to the narrow truncate apex, lateral foveæ long and narrow. Vertex definitely produced in front of eyes and angulate with front, front narrower than in *aridus*. Elytra long and narrow, with a definite stigma.

Colour: vertex black, the carinæ light yellow; face, pronotum and scutellum varying from testaceous to black, the carinæ usually light. On very dark specimens those on scutellum often obscure. Elytra subhyaline, the nervures yellow and unmarked with black spots before the stigma. Back of this more or less smoky and black punctured.

Male pygofers rectangularly notched, with a long slender tooth. Styles extending one-third their length beyond the pygofers, then curving around and passing back under their margins again.

Described from twenty-four specimens from Hayti, W. I., Md., Kans., Ariz., and various places in the southern half of Colo. The small size and unmarked nervures will separate this species from any other described.

Oliarus sementinus, n. sp.

Short and robust, the elytra flaring as in *humilis*. Colour of *complectus* nearly. Length: ♀ 5 mm., ♂ 4.25 mm.; width 2.25 mm.

Vertex short and broad, nearly twice wider than long, the anterior margin roundly angulate, almost parallel with the emarginate posterior margin, vertex scarcely reaching the anterior margin of eyes, beyond which the gibbous front extends for about half the length of vertex. Face very broad and full, convex, with the median carina indistinct or wanting. Elytra broad and flaring, nervures strong, weakly black-punctured and beset with long white hairs.

Colour: vertex and front dark testaceous, the carinae light yellow, pronotum light, scutellum light testaceous. Elytra milky subhyaline, nervures brownish at the base, then smoky, the cross nervures and apex margined with fuscous, the nervures clothed with long white hairs.

Male pygofers long and slender, deeply angularly notched with a small tooth. Styles as in *complectus*, but longer and leaving a large open space in the curve.

Described from seventeen specimens from Las Animas, Colo. Easily distinguished by the short head.

Myndus viridis, n. sp.

Form of *impunctatus* nearly, but smaller and narrower. Length: ♀ 5 mm., ♂ 4.5 mm.; width 1.5 mm.

Vertex twice longer than wide, very slightly constricted before the middle, face as in *impunctatus*, the median carinae of clypeus indistinct. Elytra long and narrow, without a stigma.

Colour: bright grass green, fading to yellowish-green in old specimens. Elytra subhyaline.

Male pygofers almost truncate posteriorly, with a triangular median tooth. Styles moderately long, their enlarged oval apices slightly overlapping.

Described from fourteen examples from Grand Junction and a pair from Ames, Iowa. The green colour will at once separate this from any described species.

Myndus impiger, n. sp.

Form and general appearance of *impunctatus*. Smaller and less plainly marked. Length ♀ 4.5 mm.; width 1.5 mm.

Vertex rather broad, expanded at the base, where it is more than half as wide as its middle length, face broad, the median carinae of clypeus distinct throughout. Elytra similar in shape to those of *impunctatus*, broader than in *viridis* and with a distinct stigma.

Colour: vertex and face testaceous, usually a horseshoe-shaped light mark on front, pronotum fuscous in front, forming a collar behind the eyes, the posterior margin and broad lateral areas light, scutellum testaceous, the carinæ rather lighter. Elytra subhyaline, the nervures brown or testaceous, sometime the apical ones clouded with fuscous.

Described from eight females from Palmer Lake, Ridgeway and Fort Collins, Colo. All taken in the mountains.

Myndus Slossoni, n. sp.

Short and stout. Black, with the margins of elytra and a median saddle light yellow. Length 4 mm., width 1.25 mm.

Vertex very broad, but slightly carinate, scarcely angled with front; front similar to *impiger*, eyes large, together with vertex nearly as broad as the pronotum. Pronotum very short, angulate behind, scutellum as in *impunctatus*, strongly tri carinate. Elytra shorter and broader than even in *impunctatus*.

Colour: vertex, face, legs and pronotum leather-brown, lighter below. Eyes, scutellum and elytra black, the costal margins of elytra with narrow white stripes extending back beyond apex of clavus, a pale yellow, illy-defined saddle occupying nearly all the claval areas back of the apex of scutellum in the female and extending nearly to the costal stripes in the male.

Male pygofer with a semicircular excavation bearing a minute knobbed median process. Styles long, touching in the middle, then obliquely divergent. Anal tube with an acute median ventral process.

Described from a single pair from Biscayne Bay, Fla. Collected by Mrs. Slosson and sent me by Mr. E. P. Van Duzee. The head is proportionally larger (broader) in this form than in any other of our species.

Æcleus lineatus, n. sp.

Resembling *decens*, but smaller and lighter coloured. Vertex narrow, right-angled. Length: ♀ 5.5 mm., ♂ 5 mm.; width 2.25 mm.

Vertex reduced to a line, over five times longer than wide, slightly wider in front than behind, projecting some distance in front of eye and meeting front in a right angle, the lateral carinæ elevated and nearly meeting behind, forming a trough. Front concave, narrow, broadening out below the middle, where it is over three times as wide as at the base,

the median carinæ obsolete at base, pronotum short, scutellum with five carinæ.

Colour: vertex and front fuscous, the carinæ light, scutellum fuscous on disc, the carinæ and lateral margins light testaceous. Elytra hyaline, the nervures pale, rather sparsely dotted with fuscous, becoming thicker towards apex, legs and below mostly pale.

Male genital segment long and parallel margined, the ventral margin produced into a broad triangular tooth which is produced at apex into a short stout tooth. Styles in a horizontal plane, longer than the tooth, strap shaped, their outer margins rounded at apex, their inner ones produced into short reflexed hooks.

Described from one female and two males from Phoenix, Ariz. (Kunze.) The narrow produced vertex will at once distinguish this species.

Æcleus excavatus, n. sp.

Form and structure of *lineatus* nearly, narrower, darker, with a broader vertex. Length 5 mm.; width 1.75 mm.

Vertex parallel-margined, twice as wide as in *lineatus*, length three times its width, projecting in front of eyes as far as in *lineatus* and meeting the front in a still sharper angle, front broader above and narrower below than in *lineatus*, base over half as wide as the apex, the median carina extending to base. Elytra long, narrow, folded at rest.

Colour: vertex and face black, the carinæ light, scutellum fuscous, the five carinæ and sometime the margin testaceous. Elytra milk-white, the sutural margins creamy, interrupted with black near the middle and again at apex of clavus, nervures pale, thickly beset with large black spots somewhat confluent towards apex. Below fuscous.

Male genital segment long cylindrical, the posterior margin ventrally produced into a long narrow tooth, constricted at the base. Styles long, the shape hidden by the wax with which they are coated.

Described from four specimens, three females and one male, from Wray, Lamar and Fort Collins, Colo.

Æcleus obtusus, n. sp.

Resembling *excavatus*, but stouter and with a shorter vertex. Length: ♀ 6 mm., ♂ 5 mm.; width 2 mm.

Vertex rather narrow, three and one-half times as long as its apical width, still narrower at base, extending scarcely more than the width of

the carinæ in front of the eye and meeting the front in an obtuse angle. Face in profile rounding, about equally margining eye from the base to the ocelli, front constricted at base, where it is one-third the width between the antennæ, the median carina obsolete at base. Pronotum roundly emarginate posteriorly, the lower posterior angle scarcely, if at all, inclined backwards.

Colour: vertex and front fuscous, the carinæ light, scutellum testaceous, carinæ testaceous. Elytra milky, the nervures smoky brown, with very faint punctures, sometimes light at base, the punctures slightly more distinct.

Posterior margin of male genital segment in the form of an equilaterally triangular tooth. Styles but little longer than the tooth, broad at base, narrowing down to just before the apex, where they are knobbed and produced into stout hooks on the inner margin.

Described from twenty-four specimens from Neb., Kans., Colo. and Utah.

Edeus campestris, n. sp.

Form and general appearance of *obtus*, slightly larger, darker and with a broader vertex and front. Length: ♀ 6 mm., ♂ 5 mm.; width 2.25 mm.

Vertex broad and short, but little over twice longer than wide, meeting the front in an obtuse angle, which is produced but a trifle in front of the eye. Front broad, rather flat, regularly widening from the broad base to just before the apex, where it is scarcely twice as wide as at the base, the median carina usually extending to base, pronotum longer than in *obtus*, the posterior margin broadly angulate, the lower posterior angles acute and inclined backwards.

Colour: vertex and front black, the carinæ light, scutellum brownish, with the five carinæ testaceous and often another pair of testaceous lines outside these. Elytra hyaline, the nervures yellow, heavily marked with dark spots, the sutural margin light, often twice interrupted with fuscous and the stigma is often fuscous marked.

Male genital segment produced posteriorly in a rounding or obtusely triangular lobe, produced at the apex into an acutely triangular tooth. Styles long, set vertically, expanded towards the apex and bearing on their inner faces, at nearly one-third their length from the apex, rounding or cylindrical protuberances.

Described from twenty-four examples from Lamar, Colo.

Æcleus fulvidorsum, n. sp.

Form of *obtusus* nearly, but smaller and with a tricarinate scutellum. Colour pale yellow, scutellum fulvous. Length: ♀ 5 mm., ♂ 4 mm.; width 1.75 mm.

Vertex a little over three times longer than wide, parallel margined, meeting front in an obtuse angle as in *obtusus*, front short and broad at base, where it is half as wide as at apex. Pronotum angularly excavated posteriorly, scutellum tricarinate or with another pair of very faint carinæ.

Colour: pale creamy yellow, the clypeus and scutellum fulvous. Elytra pale creamy, the nervures concolorous, dotted with testaceous beyond the apex of clavus.

Male genital segment long, posterior margin produced in the form of a narrow finger-like process, slightly widest at base. Styles stout, subcylindrical, but little longer than the process, their apices nearly truncate, a pair of short stout processes on their inner faces just before the apex.

Described from twenty-three specimens from Grand Junction, Colo., and one from Phoenix, Ariz. The pale yellow colour and the tricarinate scutellum easily separate this species.

Æcleus acutus, n. sp.

Form of *lineatus* nearly, lighter coloured, with a narrower vertex and tricarinate scutellum. Length 5.5 mm.; width 2 mm.

Vertex very long, simply a line on the posterior half, widening out slightly beyond the eyes, extending nearly half its distance in front of eyes and meeting front in an acute angle, front very narrow, evenly rounding in profile. Pronotum long and shallowly excavated posteriorly, scutellum tricarinate, the two lateral carinæ very near the median one.

Colour: pale yellow, slightly washed with orange on disc of scutellum. Elytra subhyaline, the nervures light with very small fuscous punctures.

Male genital segment produced into a broad short tooth with an obtusely rounding apex. Styles narrow, twice as long as the tooth, broadened at the apex, before which there is a recurved tooth on the inner margin.

Described from two males from Port au Prince, Hayti. (R. J. Crew.)

A glance at the long vertex and the three close-set carinæ on the scutellum is all that is necessary to determine this species.

COCCIDÆ OF BRITISH NORTH AMERICA.

BY GEORGE B. KING, LAWRENCE, MASS.

(Continued from Vol. XXXIII., page 336, 1901.)

Eulecanium fraxini, n. sp.—Adult ♀ scale 6 mm. long, 5 broad, 2 high; some individuals are practically circular in outline and variable in size. In July the scales are well covered with a grayish powdery secretion; this being removed they are reddish brown, considerably wrinkled and pitted, surface shiny, texture thick.

Boiled in potash the derm becomes very clear and transparent, showing some large gland-pits 24μ in diameter. Mouth-parts, legs and anal plates tinged with yellow. Antennæ practically colourless, of 7 joints, measuring in μ as follows:

Joint 1	(32)	2	(48)	3	(60)	4	(36)	5	(28)	6	(20)	7	(40)	in μ
"	24	"	44	"	64	"	40	"	24	"	20	"	36	
"	40	"	40	"	68	"	56	"	24	"	24	"	48	
"	40	"	44	"	68	"	56	"	24	"	24	"	52	

The last two lines of measurement seem to be of the normal type with a formula of 34721 (56).

Legs thin; front leg, coxa 84. Femur \times trochanter 180. Tibia 136. Tarsus 60 in length. Middle leg, coxa 108. Femur \times trochanter 176. Tibia 120. Tarsus 56. Hind leg, coxa 120. Femur \times trochanter 196. Tibia 132. Tarsus 64.

The average width of the legs, coxa 52, trochanter 52. Tibia 24. Tarsus 16. Spines of lateral clefts in threes, nearly of equal width and in length 36 and 56μ , respectively. Marginal spines 24μ long. Rostral loop long and stout.

Hab.—Ottawa, Ont., on twigs of white ash (*Fraxinus Americana*). Coll. Dr. Fletcher, November 2, 1901, and found by me at Andover, Mass., July 16, 1899, also on white ash. The slide mount which was prepared at that time does not show the derm gland-pits, but they were distinctly seen when the mount was made.

The scales have considerable superficial resemblance to *Eulecanium cerasifex*, Fitch, and *E. cynosbati*, Fitch. Structurally it differs from *Cynosbati* in not having 7×8 jointed antennæ, and in the form of 7 joints which has a very long third joint.

Dr. Fletcher also sent some blackberry twigs infested with *Aulacaspis rosæ*, which he received from Mr. J. D. Evans, of Trenton, Ont. They seem to be particularly abundant on the lower branches of the bushes (as is usually the case with this species). The species are from the same plantation where *Eulecanium Fitchi* was so remarkably abundant last summer.

Just recently I have received from Rev. Dr. Fyles, *Aspidiotus hederae*, Vall., on ivy (*Hedera*); *Lecanium hesperidum*, L., on flowering maple (*Abutilon*) and on *Euonymus* sp., and *Dactylopius citri* on passion-flower, all found in a dwelling house at Levis, Quebec. The *Dactylopius* is new to the Canadian list and perhaps has been taken to be the very common pest of the greenhouse, *Dactylopius longispinus*, Targ. At this writing (February 24, 1902) there remain only two other species of *Coccidæ* from British North America not studied and probably new, received from Mr. John Dearness.

Below is a check-list giving their geographical distribution throughout the provinces:

<i>Eriococcus borealis</i> , Ckll.	Yukon Territory (Dawson City).
<i>Phenococcus Dearnessi</i> , King.	Ontario (London).
<i>Ripersia basi</i> , Ckll.	Ontario (Toronto).
<i>Dactylopius longispinus</i> , Targ.	In all the provinces.
“ <i>citri</i> , Boisd.	There is little doubt but this can be found in all the provinces.
<i>Kermes Pettiti</i> , Ehrh.	Ontario (Rice Lake).
<i>Orthezia Americana</i> , Walk.	Ontario, Quebec.
<i>Asterolecanium variolosum</i> , Ratz.	Ontario (Niagara, Ottawa).
<i>Lecanium hesperidum</i> , L.	In all the provinces.
“ <i>pseudhesperidum</i> , Ckll.	Ontario (Ottawa).
“ <i>pini</i> , King.	Ontario (London).
<i>Eulecanium pyri</i> , Schn.	Prince Edward Island.
“ <i>antennatum</i> , var. Ckll.	Ontario, Quebec.
“ <i>juglandis</i> , Bouché.	Ontario, Nova Scotia.
“ <i>quercitronis</i> , Fitch.	Ontario (London).
“ <i>Fitchi</i> , Sign.	Ontario, Nova Scotia, Manitoba.
“ <i>Canadense</i> , Ckll.	Ontario (Ottawa, Arnstein), Nova Scotia, Manitoba.
“ <i>Fletcheri</i> , Ckll.	Ontario (Ottawa).

<i>Eulecanium macluratum</i> , Ckll.	Ontario (Niagara).
“ <i>caryarum</i> , Ckll.	Ontario (Niagara).
“ <i>nigrofasciatum</i> , Perg.	Ontario (St. Catharines).
“ <i>cerasifex</i> , Fitch.	Ontario (Niagara Peninsula).
“ <i>pruinatum</i> , Cqul.	Ontario (St. Catharines).
“ <i>Websteri</i> , Ckll. and King.	Ontario, Nova Scotia, Prince Edward Island.
“ <i>caryæ</i> , Fitch.	Ontario (St. Catharines).
“ <i>armeniaceum</i> , Craw.	Quebec (Sherbrooke).
“ <i>cynosbati</i> , Fitch.	Ontario.
“ <i>corylifex</i> , Fitch.	Ontario (Ottawa, Nepigon), Quebec (Aylmer).
“ <i>quercifex</i> , Fitch.	Quebec (Knowlton).
“ <i>rosæ</i> , King.	Quebec (Sherbrooke).
“ <i>capræ</i> , L.	Nova Scotia (Dartmouth).
“ <i>persicæ</i> , Fabr.	Nova Scotia.
“ <i>vini</i> , Bouché.	Nova Scotia (Kentville).
“ <i>Guignardi</i> , King.	Ontario (Niagara).
“ <i>Lymani</i> , King.	Quebec (St. Hilaire, North Hatley).
“ <i>fraxini</i> , King, n. sp.	Ontario (Ottawa).
<i>Pulvinaria</i> <i>innumerabilis</i> , Rathv.	Ontario.
“ <i>brassicæ</i> (?), Ckll.	Ontario.
“ <i>occidentalis</i> , Ckll.	Nova Scotia (Dartmouth), Prince Edward Island, British Columbia.
“ <i>tiliæ</i> , King and Ckll.	Ontario.
“ <i>viburni</i> , King.	Ontario, Quebec (Aylmer).
<i>Eriopeltis festucae</i> , Fonsa.	Nova Scotia, abundant; Ontario (Ottawa, rare).
<i>Aspidiotus</i> <i>hederæ</i> , Vall.	Ontario, Prince Edward Island.
“ <i>Forbesi</i> , Johns.	Ontario, Quebec, Nova Scotia.
“ <i>ancylus</i> , Putn.	Ontario, Quebec, Nova Scotia.
“ <i>ostreæformis</i> , Curt.	British Columbia, Ontario, Prince Edward Island.
“ <i>perniciosus</i> , Comst.	Ontario.
“ <i>Dearnessi</i> , Ckll.	Ontario (London).
“ <i>diffinis</i> (?), Newst.	Ontario.
<i>Chrysomphalus dictyospermi</i> , Marg.	Ontario.
<i>Aulacaspis rosæ</i> , Bouché.	Ontario, Prince Edward Island.

* <i>Diaspis Boisduvalii</i> , Sign.	Ontario.
<i>Chionaspis pinifolii</i> , Fitch.	Ontario, Quebec, British Columbia.
“ <i>Lintneri</i> , Comst.	Ontario, Quebec, Prince Edward Island, Nova Scotia.
“ <i>corni</i> , Cooley.	Ontario.
“ <i>furfurus</i> , Fitch.	Ontario, Quebec, Prince Edward Island, Nova Scotia.
“ <i>salicis-nigræ</i> , Walsh.	Ontario.
<i>Hemichionaspis aspidistræ</i> , Sign.	Ontario.
<i>Mytilaspis ulmi</i> , L.	In all the provinces.

We have now 59 species of *Coccidæ* recorded from British North America ; the two more, probably new, would make 61 species.

Distribution by provinces : Ontario has produced the largest portion, 48 species ; Prince Edward Island and Nova Scotia with 13 each ; Quebec next with 9 ; British Columbia with 6, and Manitoba, 5.

Ottawa seems to lead, with London next, and then Niagara and St. Catharines. Very few other places produce more than two or three species each, and many only one.

At present there are 37 native and 22 introduced species.

I shall be pleased to receive and determine any material in *Coccidæ* found in Canada. I would say in this connection that the last of May and June are the two best months to find the genus *Pulvinaria*, and collecting for other species can be done the year round.

BOOK NOTICE.

GENERA INSECTORUM.—Published by P. Wytzman, 108 Boulevard du Nord, Brussels, Belgium.

The third and fourth parts of this work have now been issued. Part 3 consists of 40 pages and one plate, and forms a monograph of the tribes and genera of the family *Lathridiidae* (Coleoptera, Clavicornica); lists and bibliographical references of species are given. This is a very satisfactory study of these minute beetles by the Rev. R. P. Belon, of

*This was cited as an *Aulacaspis*, but Mr. Newstead has shown it to belong to *Diaspis*. (Ckll. in litt.)

Lyons, France, who, with Mr. Fall, of Pasadena, California, is one of the few living entomologists who is thoroughly familiar with this family of Coleoptera. He divides it into five tribes and 22 genera, and recognizes about 440 species; the plate, which is clearly executed, gives the characters of all the genera.

Part 4 contains only three pages and a plate, and gives a description and illustrations, by Mr. P. Wytzman, of the genus *Leptocircus*, which forms the subfamily Leptocircinae of the Papilionidae (Lepidoptera, Rhopalocera). The plate gives excellent figures of each of the six species of these beautiful Oriental butterflies, with the venation and other details.

These two parts are in French, but we were in error in stating in our notice of Part 1 that French was to be the language employed in the work. Each contributor will write in English, French or German, whichever may be most convenient to him.

Parts 5 and 6, which are about to be issued, will be devoted to the Lepidoptera. In the former, Dr. A. Pagenstecher takes up the Libytheidae and divides the family into three genera, *Libythea*, *Hyphantus* and *Dichora*. He recognizes only ten species, all the others being considered to be varieties. The text (four pages) will be illustrated with a beautiful coloured plate.

Part 6 will contain a very extended study of the Ornithopterinae, the subfamily of the Papilionidae which includes some of the most magnificent butterflies in the world, by Mr. Robert Rippon, of London, England, the author of the great work, "Icones Ornithopterorum." He has paid great attention to these "Butterflies of Paradise," as he calls them, and as the result of his studies divides the group into six genera: 1, *Drurya* (2 species); 2, *Schoenbergia* (4 sp. and 3 varieties); 3, *Ornithoptera* (11 sp. and 11 vars.); 4, *Aethoptera* (3 sp.); 5, *Trogonoptera* (2 sp.); 6, *Pompeoptera* (24 sp. and 16 vars.). The part will be illustrated with two beautifully-coloured plates.

The plan adopted for this great work is certainly excellent, as each family, or subfamily, will be treated by the best specialist known, in whatever part of the world he may be. It is an immense undertaking, and the enterprising publisher should receive the support of all the important libraries in every country.

The
Canadian Entomologist

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No 7.

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EDITED BY

REV. C. J. S. BETHUNE,

LONDON, ONTARIO.

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1902.

EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

BRACHYNINI.—Specimens from all parts of the world wanted. GERMAIN BEAULIEU, P. O. Box 2168, Montreal, Canada.

ARGYNNIDS WANTED.—Arg. *atlantis*, *electa*, *leto*, *cypris* and *aphrodite*. Have numerous duplicates for exchange, chiefly amongst Noctuidæ. F. H. WOLLEY DOD, Box 225, Calgary, Alberta.

WANTED.—Lepidoptera from Canada and U. S. A., in papers, correctly named, in exchange for Lepidoptera of the world, correctly named. W. NEUBURGER, Halensee-Berlin, Lutzenstrasse 10, Germany.

LEPIDOPTERA.—Eggs of Giant Silkworm Royal, Underwings and Hawkmoths wanted. Name of food-plant must be given. Good Western Butterflies in exchange. Address: EDWIN Y. LANSING, Salem, Ore., U. S. A.

WANTED.—Fresh specimens of all the species of *Andrena* to be met with in various localities in North America north of Mexico; this for the purpose of working over the genus. Address: L. BRUNER, care University of Nebraska, Lincoln, Neb.

HYDRECIA.—Will exchange larvæ, pupæ and imagoes of *H. rutila* for other species of this genus. A. F. WINN, 58 Bruce Ave., Westmount, Que.

BEEES.—Fresh specimens of all the species of *Andrena* from various localities north of Mexico desired for working over the genus. PROF. L. BRUNER, University of Nebraska, Lincoln, Neb.

PLUSIAS WANTED.—Having just described some new Plusias, all from females, I wish to obtain males of these and specimens of others in which my series is short. Very liberal returns. DR. R. OTTOLENGUI, 80 West 40th Street, New York.

EUROPEAN COLEOPTERA.—I have a large quantity of European Coleoptera which I wish to exchange for American. Lists furnished. PAUL J. ROELOFS, 90 Rue van Straelen, Antwerp, Belgium.

TENTHREDINOIDEA.—Sawflies from all parts of Canada desired for study, with view to publication of catalogue. Material will be returned or exchanges made. W. HAGUE HARRINGTON, P. O. Dept., Ottawa.

WILL COLLECT any order this season in Pennsylvania and New Jersey, in exchange for Hymenoptera—unmounted. Wanted just as it comes from the field—especially Siricoidea, Tenthredinoidea, Ichneumonoidea, and Evaniidæ. J. CHESTER BRADLEY, 2221 Spring Garden St., Philadelphia, Pa.

WILL COLLECT in any order in exchange for Coleoptera and Lepidoptera (Noctuidæ specially). CHARLES STEVENSON, 906 St. Urbain Street, Montreal, Que., Canada.

N. A. LEPIDOPTERA desired. Those willing to collect, in exchange for European specimens, please communicate with JAMES MCDUNNOUGH, Kleist Str. 42, Berlin, Germany.

Have several recent books and pamphlets on N. Am. Hymenoptera which I would like to exchange for insects. Please write to G. CHAGNON, post-office box No. 186, Montreal, Can.

LEPIDOPTERA.—Papilio palamedes, Calephalis borealis and many others to exchange. Would like to receive lists. JOHN & HURD COMSTOCK, 1572 Ridge Ave., Evanston, Illinois.

LEPIDOPTERA.—Pupæ and imagoes of nearly all N. Am. Sphingidæ and imagoes of Arctians desired in exchange. HENRY ENGEL, P. O. Box 369, Pittsburg, Pa., U. S. A.

WANTED.—Erycinidæ of the world. Also butterflies from the Western and North-western States. Offer Diurnes from Central and South America, in faultless condition. LEVI W. MENGEL, Boys' High School, Reading, Pa.

DIPTERA.—Wanted, as many Asilina as possible from all parts of North America. Write for particulars to PROF. C. H. FERNALD, Amherst, Mass.

WANTED.—Ants and Termites. Specimens and literature for exchanges. H. WOLFF, S. J., Canisius College Museum, Buffalo, N. Y.

LEPIDOPTERA.—Fine bred specimens of *Catocala illecta* and *minuta* for exchange. Also *Nathalis iole*, *Anaa andria*, etc. Want Catocalæ, butterflies and sphinges. G. M. DODGE, Louisiana, Mo.

The Canadian Entomologist.

VOL. XXXIV.

LONDON, JULY, 1902.

No. 7

CLASSIFICATION OF THE FOSSORIAL, PREDACEOUS AND PARASITIC WASPS, OR THE SUPERFAMILY VESPOIDEA.

BY WILLIAM H. ASHMEAD, A. M., ASSISTANT CURATOR, DIVISION OF INSECTS,
U. S. NATIONAL MUSEUM.

(Paper No. 6.—Continued from p. 137.)

FAMILY XXVIII.—Vespidæ.

This family is restricted to the paper-making wasps, all social species living in large communities and having three distinct sexes, female, worker, and male, thus agreeing with the social bees, the *Apidæ* and *Bombidæ*, and with many ants, *Dorylidæ*, *Myrmicidæ*, *Formicidæ*, etc.

In some species, too, like the ants, there appear to be two forms of the worker.

Deceived by their habits, for structurally they are widely separated, Westwood and Packard thought the social wasps were allied to the *Apidæ*, and in their scheme of classification have placed them next to the bees, with which they have nothing in common.

Cresson, Kirby and most late writers seem to have followed them, but in my opinion it is clearly an unnatural position; they have no relationship whatever with the bees, and are a component of this great complex, but with affinities, through some exotic forms, allying them with the next great complex, or the superfamily FORMICOIDEA.

Two very distinct groups, here called subfamilies, have been recognized. They were first correctly indicated by C. G. Thomson, the distinguished Swedish entomologist, who called them tribes.

Table of Subfamilies.

Hind wings entire, *without* an anal lobe, mesepisterna not separated Subfamily I.—Vespinæ.
Hind wings *with* a distinct anal lobe; mesepisterna separated Subfamily II.—Polistinæ.

SUBFAMILY I.—Vespinae.

1874. Vespina, Tribus. Thomson, Skand. Hym., III., p. 6.

The absence of an anal lobe in the hind wings, and the non-separated mesepisternum, distinguish the group. The species, too, are much shorter, more robust, with a decidedly shorter mesonotum.

Paravespa, Radoszkowsky, described in 1886, I do not know, but have incorporated it from the description alone.

Three genera have been recognized, separable as follows:

Table of Genera.

First abdominal segment broadly truncate at base.

Eyes not extending to the base of the mandibles.....2.

Eyes extending to the base of the mandibles, or very nearly.

Third cubital cell along the radius fully as long as along the cubitus.....*Vespa*, Linné.

(Type *V. vulgaris*, Linné.)

Third cubital cell along the radius much shorter than along the cubitus*Paravespa*, Radoszkowsky.

(Type *P. Komarowii*, Radoszk.)

2. Third submarginal cell along the radius longer than along the cubitus, or about twice as long; clypeus longer than wide, sinuate or slightly emarginate anteriorly and semicircularly emarginate at sides anteriorly.....*Vespula*, Thomson.

(Type *Vespa austriaca*, Panzer.)

SUBFAMILY II.—Polistinae.

1874. Polistina, Tribus. Thomson, Skand. Hym., III., p. 6.

In this subfamily the hind wings have an anal lobe, and the mesepisternum is separated.

The genera are numerous, and have reached their greatest development in tropical countries. The group is of great economic importance, as the various genera destroy the more destructive Lepidopterous larvæ.

Table of Genera.

Second cubital cell receiving both recurrent nervures.....2.

Second and third cubital cells each receiving a recurrent nervure.

Second cubital cell petiolate; clypeus terminating in a tooth; mandibles short, acutely dentate at apex*Anthreneida*, White.

(Type *Vespa Sumatra*, Weber.)

-
2. Abdomen petiolate ; mandibles 2-4-dentate ; maxillary palpi 5- or 6-jointed 4.
 Abdomen not petiolate.
 Abdomen subsessile, the first segment campanulate 3.
 Abdomen sessile, the first segment very small, rounded above, the second very large, occupying most of the surface, the following being more or less retracted ; second cubital cell wider than long ; scutellum entirely covering the post-scutellum Nectarinia, Shuckard.
 (Type *Brachygastra analis*, Perty.)
3. Metathorax smooth or punctate ; abdomen rather short, subovate or oval Chartergus, Latreille.
 (Type *Vespa apicalis*, Fabr.)
 Metathorax transversely striate or aciculate ; abdomen long, fusiform, or elongate ovate Polistes, Latreille.
 (Type *Vespa biglumis*, Linné.)
4. Front wings with *three* cubital cells 5.
 Front wings with *two* cubital cells Paraicaria, Gribodo.
 (Type *P. bicolor*, Gribodo.)
5. Abdomen with the first segment, or petiole, linear, the second segment more or less constricted or petiolate at base 7.
 Abdomen with the first segment, or petiole, clavate or subglobose at apex, the second segment normal, not constricted at base.
 Second abdominal segment not especially large, not occupying most of the surface nor covering the third 6.
 Second abdominal segment very large, occupying most of the surface, and covering the third, the terminal segments more or less retracted ; mandibles 4-dentate, the inner tooth the smallest ; clypeus wider than long, slightly rounded or subtriangular anteriorly, but not dentate Icaria, Saussure.
 (Type *I. artifex*, Sauss.)
6. First abdominal segment subcampanulate ; body of abdomen conical ; prothorax narrowed, not margined above ; temples as broad or a little broader than the width of the eyes Synœca, Saussure.
 (Type *Vespa Surinama*, Linné.)
 First abdominal segment variable, sublinear or clavate ; body of abdomen fusiform, clavate or subovate ; prothorax short ; temples

- scarcely so broad as the width of the eyes; mandibles 4-dentate, the teeth subequal; clypeus angulate anteriorly. Polybia, Lepeletier.
(Type *Polistes liliacea*, Fabr.)
7. Body elongate, cylindrical, or fusiform, the abdominal petiole very long; mandibles 3- or 4-dentate. 8.
Body rather short, not elongate, the abdominal petiole not especially long; mandibles bidentate.
Body of abdomen rotund; eyes small, the malar space distinct. Gyrostoma, Kirby.
(Type *Cyclostoma orientalis*, Kirby.)
Body of abdomen short-ovate; eyes large, the malar space very small or linear. Tatua Saussure.
(Type *Vespa morio*, Fabr.)
8. Body of abdomen fusiform, the second segment pedicellate. 9.
Body of abdomen elongate, cylindrical or nearly, the second segment *not* pedicellate and scarcely longer than the third. Apoica, Lepeletier.
(Type *Polistes virginea*, Fabr.)
9. Second cubital cell trapezoidal, narrowed above; mandibles 4-dentate.
Clypeus short, angulate anteriorly; maxillary palpi 5-jointed. Belonogaster, Saussure.
(Type *Vespa grisea*, Fabr.)
Clypeus anteriorly slightly emarginate and bidentate; maxillary palpi 6-jointed, the last joint the longest. Mischocyttarus, Saussure.
(Type *Zethus labiatus*, Fabr.)
Second cubital cell triangular; mandibles 3-dentate; clypeus wider than long, subemarginate at apex; maxillary palpi 6-jointed, the first joint elongate, the last two small. Paramischocyttarus, Magretti.
(Type *P. subtilis*, Magretti.)

ERRATA.

In Mr. G. B. King's paper on the "Coccidæ of British North America," in the June number, the following corrections should be made:

Page 159, for *Ripersia basi* read *R. lasii*.

Page 160, for *Pulvinaria brassicæ* read *P. brassiæ*.

Page 160, *Aspidiotus Dearnessi*, Ontario (London), is from Lake Huron, not London.

MR. GROTE'S CRITICISMS.

BY HENRY H. LYMAN, MONTREAL.

As Mr. Grote has done me the honour to make certain criticisms on some of my recent papers, I would ask space for a brief reply.

In regard to *Gortyna Ærata*, I have no doubt that it has an alternative food-plant, but possibly it may never be discovered. Mr. Bird has made the same point, that as burdock is an introduced species it could not be the original preferred food-plant of any American species. But, while I admit that an introduced species could not be the original food-plant of an American insect, I see no reason why it should not be the preferred food since its introduction, just as *Doryphora Decemlineata* prefers the potato to its original food-plant.

If the difference between *Nitela* and *Ærata* was not made sufficiently apparent in my description, it was because I never thought of the two being confused, as the difference in colour is so marked, while Dr. Dyar had, as stated, expressed the opinion that my specimen was only a variety of *Necopina*, and Mr. Bird, to whom I also showed it, never suggested any close relationship to *Nitela*, but said that if the larva proved to be distinct from that of *Necopina* I would be warranted in describing it as a new species, and I am quite sure that had I not bred the species no one would have believed that a flown specimen of it was anything but an example of *Necopina*.

In regard to the names *Nitela* and *Nebris*, I must confess that I was a little amused at being chided as too strict a stickler for the rigid enforcement of the law of priority, especially in view of the fact that I have already expressed the opinion that the law of priority should not be maintained in favour of the variety as against the prevailing form of the species*, but if I am going to extremes in carrying this law back two inches, and that is all the priority I claim for the name *Nebris*, what should be thought of Mr. Grote in carrying it back to primeval times, long before there was any entomologist to criticise his fellows, to say nothing of studying these creatures.

If, as conjectured by Mr. Grote, the form *Nitela* was the primitive form, and the form *Nebris* is a more specialized form which has been evolved from it, it would seem probable that in course of time the latter would become the dominant one, in spite of the varietal name which Mr.

*CAN. ENT., XXIX., 256.

Grote wishes to keep tied to it. Not only so, but if the tendencies which produced this form continued, the form *Nitela* might become extinct, and yet *Nebris* would only be var. *Nebris* of the extinct *Nitela*.

Surely we must classify species as we find them existing at present, and not on the basis of any man's conjecture of what they may have been hundreds of thousands of years ago. If the law of priority is to be carried back to primeval times, it will be invested with new terrors.

In regard to my remarks on *Lophodonta Angulosa* and *Lophodonta Georgica*, or, as Dr. Packard in his work on the Bombycine Moths gives them, *Lophodonta Angulosa* and *Drymonia Georgica*, I confess that I had overlooked the paper by Messrs. Grote and Robinson in the Annals of the N. Y. Lyceum N. Hist.

Of course, theoretically, anyone who ventures to write on any entomological subject is supposed to be acquainted with everything which has ever been published on that subject in his own country, and in every other country, but practically if we attempted to follow that rule, I am afraid that little, if anything, would be written. We have to take some chances, and a man away from large entomological libraries must depend to a certain extent upon catalogues and indexes, and in no record or catalogue which I possess is this paper referred to.

I am much obliged to Mr. Grote for calling my attention to it, and may point out that the authors fell into the error of giving the number of Abbot & Smith's plate as 78 instead of 83, as given by me.

I disagree with those gentlemen, however, in their conclusions, as there is not a particle of evidence pointing to the probability of the "lower right-hand figure" of Abbot's plate being a male. It was figured as a female, and presumably belonged to that sex. It is, of course, possible that Abbot may have been mistaken, and it may have been a male, just as he figured a small female of *Phobetrion Pithecium* as the male of that species, a not very heinous error when the extremely aberrant character of the male is considered, but even if it was a male, I fail to see that that would make any difference. The upper left-hand figure was the one described as the typical form, it being distinctly stated that the males and the majority of the females were of that type, while the lower right-hand figure was given merely as a variety of colour.

Mr. Grote says that Abbot & Smith's name became restricted to this supposed "variety of colour" by Herrick-Schaffer's description of *Georgica*, but he did not describe it; he merely published a figure, a

much better one, it is true, than Abbot's, and put down the name in the various lists given in the work, thus :

Page 11. Notodonta Georgica—angulosa, Abbot.

Page 66. Notodonta O.

angulosa Abbot — georgica, H.-S., fig. 384 — Georg. Am.

Page 82. No. 384, Notodonta georgica, H.-S., foem.—Notodonta angulosa, Abbot.

So far as I have been able to make out, it was merely a substitution of the name *Georgica* by Herrick-Schaffer for the name *Angulosa* proposed by Sir J. E. Smith, in much the same way as the latter tried to substitute the name *Sphinx Chionanthi*, A. & S., for *Sphinx Rustica*, Fabr., and I hold that if he recognized that Abbot had figured two species on that plate, he should have given his new name to the species represented by the lower right-hand figure.

A NEW SPECIES OF MELANOPLUS FROM ARIZONA.

BY A. N. CAUDELI, WASHINGTON, D. C.

Melanoplus Brownii, sp. nov.—General colour brownish fuscous. Head slightly prominent, with the occiput elevated a little above the pronotum and with a black postocular stripe; interspace between the eyes no broader than the basal segment of the antennæ; fastigium moderately declivent and deeply sulcate, especially in the male; frontal costa percurrent and deeply sulcate except above, where it is biserially punctate. Eyes large and somewhat prominent, distinctly longer than the infraocular portion of the genæ. Antennæ long, in the male as long or longer than the posterior femora. Pronotum equal in the anterior portion, but quite noticeably expanding on the metazona, truncate anteriorly, posteriorly obtuse angulate, the angle rounded; lateral lobes marked with a more or less interrupted black stripe which is continuous with the postocular stripe of the head. Median carina distinct only on the metazona, which is shorter than the prozona. Prosternal spine suberect, pyramidal, apically acuminate. Interspace between the mesosternal lobes longer than broad; metasternal lobes subattinent. Elytra long and slender, extending far beyond the hind femora in both sexes, almost

immaculate. Hind femora moderately slender, uniformly brownish, often darker above and externally and sometimes with slight fuscous genicular markings. Hind tibiæ yellowish brown, the spines tipped with black, ten to eleven in the outer series. Extremity of male abdomen neither swollen nor upturned. Furcula broad as in the other members of the group to which this species belongs; cerci shaped very much the same as those of *M. Bowditchi*, somewhat incurved and externally sulcate at the tip, sometimes very inconspicuously so. Subgenital plate long, apically narrow.

Length: elytra, male 18.5 to 19.5 mm., female 23 to 24 mm.; hind femora, male 10.5 to 11 mm., female 13 to 14 mm.

Three males, three females, Yuma, Arizona.

Type No. 6302, U. S. Nat. Mus.

These specimens were sent to the Department of Agriculture by the collector, Mr. Herbert Brown, superintendent of the territorial prison at Yuma, Arizona. They were collected on December 8th, 1901, a few miles from Yuma, up the Colorado River, at the head of a dry slough. They belong to the *Bowditchi* series, and the species is most nearly allied to *M. pictus*, from which it is readily distinguished, however, by the differently-shaped cerci and the smaller size.

ACKNOWLEDGMENTS.

On the 26th of May, 1902, I received from Mr. C. G. Anderson, London, a freshly-emerged specimen of *Papilio Ajax* (spring form, *Telamonides*, Feld.), taken by him at Kingsville on the 24th—another testimony to the southern character of the flora and fauna of Lake Erie's northern shore.

I desire to give expression to my pleasure in receiving from Mr. J. A. Morden, London, Ont., twenty-four specimens of that rarely-observed beetle, *Cyllene pictus*, Drury, which he secured for me out of a stick of bitter-nut hickory in the first week of May, 1902.

J. ALSTON MOFFAT.

NEW GENERA AND SPECIES OF ACARIANS.

BY NATHAN BANKS, EAST END, VA.

In the following pages I have included descriptions of a few new genera and species of mites that have been in my possession for some time. Several of the genera are for the first time recorded in America. A note is added on two species of *Trichotarsus*. Of the two new genera, the *Liroaspis* is a very remarkable form, and finds its nearest allies in certain tropical species.

Trombidium granulatum, n. sp.—Bright blood red, the legs are clothed with scale-like hairs, those on the basal joints are white, elsewhere they are red, except on the apical joint of leg I., which is mostly white; the palpi and mouth-parts are mostly white, but reddish toward the tip. The body is covered above with rounded elevated granules, subequal in size and height; on the under side they are more scarce and there are some short red hairs. The body is hardly twice as long as broad, broadest at humeri, slightly constricted over base of the third legs, and broadly rounded behind; the dorsal outline at juncture of head and abdomen shows very little depression; on the cephalic part there is a median groove, and each side are two sessile eyes. The legs are short and stout, the last joint of leg I. is somewhat swollen, and plainly longer than the preceding joint; on the median joints of legs I. and II. there are above smooth stripes, where there are few hairs. The hind legs reach considerably beyond end of abdomen, the last joint is not swollen and is about equal to the penultimate. The genital opening is circular, and pale; the anal opening is elongate. The palpi are short, the second joint much swollen; the thumb is clavate, and barely passes the stout claw. Length, 1.8 mm.

A few specimens from Ft. Lee, New Jersey. This species, by its granular covering, is closely allied to the European *T. sanguineum*, Koch. In that species, however, the thumb of palpus is not clavate, but pointed, the last joint of leg I. is more swollen, the hind legs are rather shorter, and the bases of the legs are not pale in colour.

Ammonia Americana, n. sp. (Fig. 5).—Rather brownish yellow, with a red mark each side (in alcohol these are lost), and a reddish stripe behind, legs and palpi paler. The mandibles are short, less than the length of the cephalothorax, with two bristles each side; palpi short, second joint about three times as long as broad, third indistinctly separated from the second, about as long as broad, fourth scarcely longer

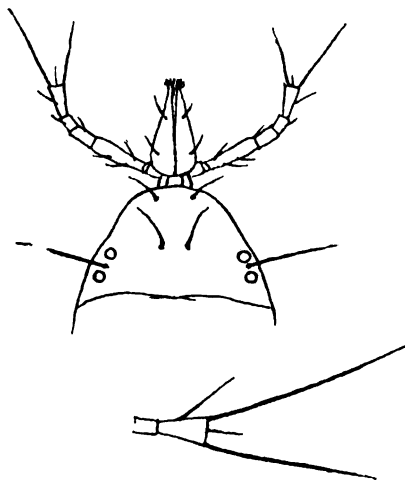


FIG. 5.

than broad, fifth about one and one-half times as long as broad at tip, with two long hairs at tip, the outer one more than twice as long as joint; body almost twice as long as broad, sides (beyond eyes) sub-parallel, broadly rounded behind; two eyes each side, and near them a long seta; two setæ in front and two on middle of the cephalothorax; on anterior margin of the cephalothorax is a single black quadrangular mark with a white circle in it. Length, .75 mm. Washington, D. C. (March.)

Specimens were taken on wet ground under stones and among short grass; it is the first species of the genus that I have seen from America.

Notophallus dorsalis, n. sp.—Black; legs red; a large elongate red spot on the posterior median dorsum, containing the anal opening; a large eye each side on the anterior portion; some scattered short hairs above. Legs short, first pair scarcely longer than the body, fourth pair shorter than the body. Genital opening large, elliptical, divided longitudinally; palpi short, red. Length, .8 mm.

A few specimens taken at Washington, D. C., in the early spring; on ground under stones and sticks. It is the first record of the genus in this country; a genus differing from all our other Eupodidæ in having the anal opening on the dorsum.

Cheyletus clavispinus, n. sp.—Body pale reddish or yellowish, fading out in alcohol. Body somewhat quadrangular, corners rounded, about

one-fourth longer than broad; above on each side with two rows of about seven or eight long clavate and finely serrate bristles, one row is lateral, and one submedian; at the tip there are two long bristles and two shorter intermediate ones; the palpi are short and stout, outwardly geniculate, bearing above two prominent clavate hairs, last joint with a slender curved claw and with the usual serrate organ; first legs as long as body, tarsus slender, tipped with two hairs longer than the joint itself, penultimate joint with two clavate hairs above and two moderately long simple hairs at the tip; a few clavate hairs on the other joints; other legs with a few clavate hairs on the joints except the tarsi; fourth legs about as long as the body; venter with a few scattered simple hairs. Length, .6 mm.

Specimens were received from Dr. Blatchley, who took them from beneath the wings of an *Aradus* found near Indianapolis, Indiana. A European species has also been recorded as found on *Aradus*; but it is different from ours.

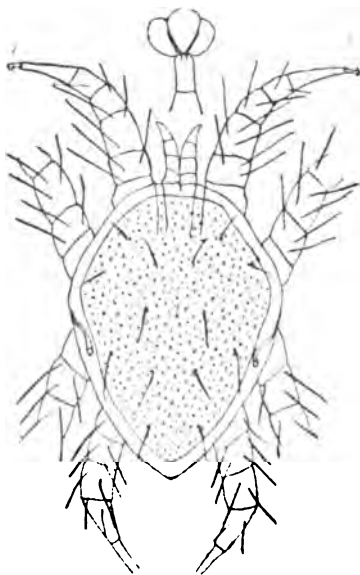


FIG. 6.

Pteroptus Americanus, n. sp. (Fig. 6).—Pale yellowish. Body about one and one-half times as long as broad; truncate in front, broadest just behind the second pair of legs, thence tapering to an almost acute tip; shield nearly as large as the dorsum, leaving a narrow margin all around, broader on the sides than in front; peritreme situate over the third coxæ,

arcuate; dorsal shield plainly granulate, and provided with a few scattered, short hairs; legs short and heavy, with rather long tarsi, terminating in the usual two claws and swollen pad, the basal joints with a number of stout bristles, most of them longer than the diameter of the joints. Palpi quite long, divergent. On the front of the body are seen four parallel lines, reaching back a short distance. Length, 1 mm.

From a bat in a cave in Indiana (Blatchley). Nearest to *P. euryalis* of Europe, but with a longer body, more granulate shield, and more slender tarsi. The truncate anterior margin is also peculiar. This is, I believe, the first time the genus has been recorded from this country.

Liroaspis, n. gen.—A Gamasid, probably related to *Lercon*. The genital opening is in front of sternal plate; the dorsal shield is divided into six pieces, a large piece in front, a smaller piece near tip, and four small median pieces arranged in a quadrangle. The claws are all very weak, especially so in the front legs. The peritreme runs along above the coxæ for a considerable distance. The body is broad, and rather flat; behind emarginate and tipped with four spine-like bristles. The anal opening is small and near tip of body. Type *L. Americana*, n. sp.

I also refer to this genus the *Seius acanthurus*, Can., described from Australia, and also recorded from Italy. Berlese puts it in *Lercon*, which, however, is distinct by the short peritreme, etc.

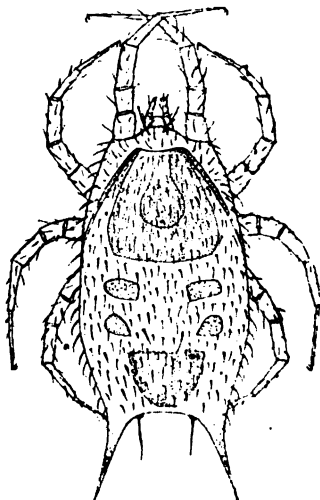


FIG. 7.

Liroaspis Americana, n. sp. (Fig. 7).—Yellowish throughout. Body a little more than one and one-half times as long as broad, about as broad

in front as behind, broadest in middle, sides evenly convex, each posterior angle prolonged into a spinelike process tipped with a long stout bristle. They are slightly divergent, and between them are two long stout bristles arising from the hind edge of the body. The anterior margin of the body is rounded, and prominent in the middle, and bears two submedian bristles. The dorsal surface of the body is scantily clothed with short curved bristles, and there is a row of bristles along each side-margin. There are six shields on the dorsum; in front is a large trapezoidal piece containing a paler central figure, from the anterior angle of this trapezoid a curved line extends backward and reaches the side-margin before the middle. Behind this large piece are four submedian pieces, the anterior pair longer than the posterior pair, and fully their diameter apart. Behind there is a median semicircular piece, the convexity behind. The legs are all shorter than the body and with many bristles. Length, 1.5 mm.

Specimens from Olympia, Washington, and from St. Croix Falls, Wisconsin. A remarkable and interesting species, evidently confined to northern localities.

Hoploderma granulata, n. sp.—Pale yellowish brown. Dorsum as high as broad, evenly convex above; about one and two-thirds times as long as broad, broadly rounded in front and behind, broadest in middle, its surface quite coarsely but evenly granulate, and provided with about twenty erect bristles, mostly situate around the margin, nearly all rather thick and blunt-pointed. Cephalothorax about once and one-third longer than broad, broadly rounded in front, finely granulate and with two long superior bristles. Ventral openings subequal in size, each about as broad as long; the anal one slightly indented behind; setæ quite long arcuate. Length, .6 mm.

Three specimens from Ottawa, Canada (Harrington). Distinct by elongate form and granulate dorsum.

Gymnobates, n. gen.—Tarsi with three equal claws; abdomen provided with wings, with an extension forward over the basal part of the cephalothorax. Tarsi broad at tips. Setæ short, capitate. The coxæ marginal. Sternum divided by two transverse lines. Ventral openings far apart. Type *G. glaber*.

Differs from *Oribates* in the tarsi being broad at tip, and the abdomen extending over the cephalothorax.

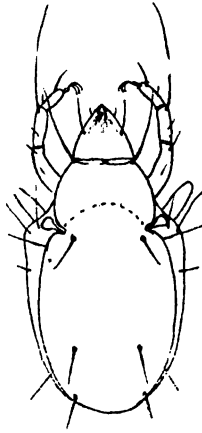


FIG. 8.

Gymnobates glaber, n. sp. (Fig. 8).—Pale yellowish brown. Cephalothorax smooth; about twice as long as broad, tapering in front, its basal half covered by an extension of the dorsum of abdomen; from each anterior corner of this extension is a long, stout bristle; on the cephalothorax toward tip is a bristle each side. Abdomen smooth; exclusive of wings, it is about one and three-fourths times as long as broad, broadly rounded behind; with six bristles above, two at base, two toward tip, and two on hind margin. On each side of dorsum is a slender wing, broadest in front, with four or five bristles above, three of them in front. Setæ short, capitate. Legs rather short, the second pair largest, joints sub-fusiform, tarsi broad at tip, the tibia with a long hair at tip above. A lamella behind coxa I. Genital opening nearly circular, nearly twice its diameter from the much larger anal opening, the latter sub-elliptical and emarginate in front. Length, .45 mm.

One specimen taken from a dry gall, at Washington, D. C.

Trichotarsus osmie, Dufour.—I have taken specimens of a species of *Trichotarsus* from a species of *Osmia*, at Sea Cliff, N. Y., which appears to agree in all particulars with this European species. It is, of course, possible that when the adult females of these forms are known, they may present differences. This species differs from the more common *T. xylocopæ* in having two claws at tips of tarsi I., II. and III.

Trichotarsus xylocopa, Dufour.—Prof. H. Osborn has recorded this species as taken from a Californian *Xylocopa*, and sent him by Mr. Coquillett. It is a common European species.

ON THE GENUS *LECANIUM*.

BY MRS. C. H. FERNALD, AMHERST, MASS.

In the preparation of my Catalogue of the Coccidæ I was not able to find where Illiger had proposed or described the genus *Lecanium*, although Burmeister in his Handbook of Entomology, Vol. II., p. 69 (1835), used this genus, giving Illiger as the authority. Burmeister described the genus and placed under it *hesperidum*, Linn., and several other species. My husband, Prof. C. H. Fernald, wrote to Mr. Theodore Pergande, inquiring if he could give me any information whether Illiger had really published this genus, and if so where it could be found. Mr. Pergande has sent the following letter in reply, and has consented to have it published :

“ My dear Professor,—In accordance with my promise of December 9, 1901, regarding the authority for the genus *Lecanium*, I wrote to Dr. K. Mobius, Director of the Zoological Museum of Berlin, Germany, for information on this point, and received lately from Dr. Th. Kuhlitz, Assistant in the Museum, the following answer :

“ ‘ In answer to your request, I inform you herewith that the generic name *Lecanium*, Illiger, in Burmeister’s Handbook, Vol. II., was doubtless the first publication of this name ; a name which Illiger, prior to Burmeister’s publication, had either written on some label or used in some manuscript which was never published. ”

“ ‘ At any rate, I have failed to find anything in the literature pertaining to this genus, which would justify us to accept Illiger as the author.

“ ‘ I wish to call your attention to the fact that Burmeister frequently credited the authorship for specimens to someone else, notwithstanding that the first publication of such species was made by himself.

“ ‘ For instance, he credited the authorship of *Colobatristes macronatus*, Handbuch II., p. 325, which was described by him for the first time, not to himself, but to Klug. The label of the type in the Berlin Museum explains it fully. The label shows neither the name of Burmeister nor of Klug, as being the author, but simply “ N,” behind the name of the

species. "N" means simply, "Nomen in litteris," which Klug himself added to the specific name, to indicate that thus far this name was only used privately and did not yet exist in print. Burmeister adopted this name later for this species and described it for the first time, retaining the manuscript name and cited Klug as the author, though surely wrongly, of which Burmeister, as is universally acknowledged, is the author.

"As far as I have been able to see, the original label for the genus *Lecanium* has not been preserved in the Berlin Museum.'

"In the hope that this communication will straighten the matter, I remain,

Most sincerely yours,

"THEO. PERGANDE."

Dr. O. G. Costa published his *Nuove Osservazioni intorno alle Cocciniglie* in the *Atti del R. Instit. d'Incorrag.*, Vol. VI., pp. 31-52. This volume bears the date 1840 on the title page, but as Vol. V. is dated 1834, and as the separatum, which is exactly like the above-named paper except in pagination, bears the date 1835, it is quite certain that the first part of Vol. VI. was also published in 1835. Dr. Hagen was in error in giving 1828 as the date of this paper.

Costa in his *Fauna del Regno di Napoli* Emitteri divides the Coccidæ into three genera, as follows: Genus *Calypticus* with *hesperidum*, Linn., and *spumosos*, *lævis*, *aterrimus*, *radiatus*, *testudineus* and *fasciatus* of Costa. The first species, *hesperidum*, Linn., may be regarded as the type.

There is some doubt as to the exact date of publication of the Coccidæ in this work, but Hagen gives the date of the entire work 1832-1858. The Coccidæ of the *Fauna* is referred to in the *Nuove Osservazioni*, several times in such a way as to lead me to believe that it was published before 1835, and therefore *Lecanium*, which dates only from 1835, is preoccupied by *Calypticus*, Costa.

There is another work by Costa which I have not yet been able to see. This is his *Prospetti di una nuova descrizione metodica del genera Coccus L.*, published in Naples in 1828. From a reference to this in the *Fauna del Regno di Napoli*, I infer that he proposed generic names which he changed in his later works. Whether these names were established in such a way that they may be used to the exclusion of the later ones, I have not yet been able to learn.

A RECENTLY DISCOVERED GENUS AND SPECIES OF
AQUATIC HYMENOPTERA.

BY J. CHESTER BRADLEY, PHILADELPHIA, PA.

In the Annales Soc. Ent. de France, LXIX., p. 171, P. Marchal publishes an article entitled "Sur un nouvel Hyménoptère aquatique, le *Limnodytes gerriphagus*, n. gen., n. sp."

Mr. Marchal is to be complimented on his discovery and observation of the habits of this very interesting insect, but it is deeply to be regretted that the generic name which he has chosen is preoccupied, hence it becomes necessary to change it, and desirable to do so at once, before it becomes widely known. The name *Limnodytes* was employed by Dumeril and Bibron in their "Erpétologie générale," Vol. VIII., 1841, p. 510, for a genus of salamanders, hence I propose in its place the term *TIPHODYTES*, nov. name.

In this connection I may apropos make a few remarks, gathered from Marchal's paper, concerning the habits and relations of this insect.

Metchnikoff, and after him Ganin, mentioned finding an unknown species of *Teleas* as a parasite on the eggs of *Gerris* (Hemiptera-Heteroptera). Marchal found the present species during the month of May, in the pond of Trivaux, Meudon, near Paris, also parasitizing the eggs of *Gerris*, but he considers it distinct, although closely related to the one found by Metchnikoff and Ganin. On the 12th of May he collected eggs which were animated with the larvæ of the parasite. These eggs were always arranged along the lower surface of *Potamogeton* leaves. The larvæ differed from those figured by Ganin in the arrangement of the hair and brevity of the caudal cornus. In June, four female and two male adults hatched, and these used their wings for swimming in any direction through the water, with a leisurely movement. When they came to the surface they had to make an effort to pass through it into the air, where they readily took flight. Likewise, in entering the water the insect bent its head forward and made a visible effort to conquer the resistance offered by the surface film, unless it entered on the edge of a projecting leaf or twig.

My excuse for entering at length here into an abstract and discussion of Marchal's article is because aquatic examples of the Hymenoptera are very few, and the fact that winged adults of such an order should enter and swim in the water must interest many entomologists who will never see the original article.

Amongst those already known may be mentioned *Agriotypus armatus*, Walker, which is confined (as are the others) to the European fauna, and has been observed swimming beneath the water, being parasitic on the larvæ of various Trichoptera. It forms a family of its own, probably related most closely to the Ichneumonidæ. *Polynema natans* belongs to the Mymarinae (Proctotrypidæ), and resembles in method of swimming Marchal's species, but its wings are somewhat abortive, and it is thought that it cannot fly well. It is parasitic on the eggs of *Calopteryx*. Lastly, *Prestivichia aquatica*, said to be a Chalcid, is parasitic on the eggs of Notonectus and Dytiscus, as observed by Lubbock and Enoch, and swims with its legs instead of its wings.

Marchal places his genus within the Proctotrypidæ, subfamily Scelioninae, close to the genus *Thoron*. For its characters I must refer the reader to the original memoir.

So far as I know, aquatic Hymenoptera are as yet unknown to the American fauna. But there should be—at least, it is quite likely that there may be—some species which has adopted an aquatic life here as well as in Europe. Who will be the first to find one?

TWO NEW SILPHIDÆ FROM COLORADO.

BY H. F. WICKHAM, IOWA CITY, IOWA.

Silpha Coloradensis, n. sp.—Form of *inequalis*, but more elongate, black, except the tip of the abdomen, which is orange-rufous; above clothed with short black hairs. Head densely punctate, the punctures regular over the greater part of the surface, those in front of the inter-antennal line smaller and less distinct; occipital transverse impression deep; labrum short, broadly emarginate; antennæ black, club four-jointed, the last three joints pubescent, the terminal one longer, compressed, tip sinuately rounded. Thorax about one and one-half times as broad as long, narrowed anteriorly, sides broadly arcuate in front, more suddenly so behind, basal lobe slightly and very broadly emarginate. Surface somewhat irregular, densely and very regularly punctate, sides somewhat flattened. Scutellum slightly concave, densely punctured. Elytra as wide as the thorax and fully twice as long, the sides nearly parallel, outer margins distinctly reflexed, apices conjointly rounded, but sinuate externally, punctuation less dense than that of the thorax, each puncture with a recumbent hair. Disk flat, more suddenly declivous at sides than in *inequalis*, each elytron with three costæ, the outer of which is much the best marked, being high, acute, not terminating opposite the

tuberosity, but suddenly bent inward at this point; the middle costa passes through the tuberosity, is almost obliterated except at tip, and very nearly reaches the apical margin; the inner costa distinct only near the tip, also nearly attaining the apex; tuberosity high. Body beneath shining, scabro-punctate, hairy, the hairs longer and paler on the metathorax sclerites, those on the last two abdominal segments and on the hind margin of the one preceding, orange. Length from anterior margin of thorax to apex of elytra, 11 mm.

The type is a male from the vicinity of the Argentine Pass, near Georgetown, Colorado, having been taken at an altitude of over 12,000 feet. The anterior tarsi are moderately broadly dilated, while the hind tibiae are straight and without hook at tip. It may possibly be a subspecies of *trituberculata*, to which it is evidently more closely allied than to any other species in our fauna.

Colon Liebecki, n. sp.—Oval, more pointed behind, moderately convex, brown, elytra and under surface paler, legs and base of antennae rufous; pubescence yellowish, not obscuring the surface colour. Head cribrately punctured, each puncture bearing a hair. Antennal club five-jointed, brownish, the last four joints very broad; scape rufous. Prothorax broadest a little in front of the base, narrowed to apex, sides arcuate, hind angles quite broadly rounded, surface finely punctured, pubescent. Elytra a trifle narrower than the thorax, broadest in front of the middle, gently narrowed behind, the sides slightly arcuate, punctuation about as on thorax, sutural stria entire but faint. Under surface of body moderately punctured, pubescent. Length, 1.8 mm.



FIG. 9.

In the male, the anterior tibiae are arcuate, the outline of the inner edge might almost be called sub-angulate (see figure 9), the front tarsi are moderately dilated, the middle and hind tibiae straight, the posterior femora with a small tooth near the middle; in the female the tarsi are not dilated, the tibiae straight and the hind femora without tooth.

Collected at Breckenridge, Colorado, in July. This species seems most closely related to *C. dentatum*, Lec., but is distinct by the male characters.

NOTE ON THE LARVÆ OF *PENTHINA HEBESANA*, WALK.

BY ARTHUR GIBSON, OTTAWA.

During the winter of 1900-1901 the larvæ of this pretty Grapholithid were rather abundant at Ottawa, hibernating in the heads of mullein (*Verbascum thapsus*). Full-grown specimens were collected by the writer and Mr. C. H. Young in April, which pupated in the office on and about the 25th April, the first moths appearing on the 11th May, and the last specimen emerging on the 22nd May.

These larvæ were found in the seed-pods, and had been feeding on the seeds; numbers were present in the same head. As far as the writer knows, this is the first record, at least in Canada, of the caterpillars feeding on mullein. Dr. Howard writes that Mr. Coquillett has reared the species from *Stachys palustris*, and Mr. Chittenden from a species of flag. He adds: "It evidently has several food-plants, and sometimes it does injury to plants after they have been pressed for the herbarium."

When mature the larva is 8.5 mm. in length, at rest; when extended, 10.5 mm. The head is 1.0 mm. wide, jet black, smaller than segment 2, rounded, flattened in front, furrowed at apex; clypeus high; setæ pale, darkened towards base, some of the hairs long and some short; mouth-parts brownish; antennæ pale, darkened towards tips, pale at tips. Cervical shield shiny, not so black as head, anterior portion slightly reddish, the whole divided by a pale line. Body plump, cylindrical, dull copper colour, with a faint dark dorsal stripe. Skin finely pitted. Spiracles inconspicuous, ringed with black. Each segment has one distinct crease. Tubercles rather faint, same colour as body, setæ pale; hair from tubercle i. short, from ii. long; tubercle i. anterior to ii., iii. in a line with ii. Anal plate blackish. Thoracic feet shiny jet black; prolegs concolorous with body.

On the 24th March, 1902, two larvæ were found in the seed-pods of the above plant, but neither of these showed any trace of a dorsal stripe, and their colour was more of a dull red, not so bright as those from which the above description was taken. These two specimens were inside a thin cocoon of white silk, where they were doubtless awaiting the return of warm weather before pupating. More larvæ were collected early in May, one of which was of a dull greenish shade, with the faint dark dorsal stripe, hardly traceable on some segments.

I am indebted, through Dr. Fletcher, to Dr. Dyar for the determination of this species.

SOME GALL-INSECTS.

BY T. D. A. COCKERELL, EAST LAS VEGAS, N. M.

Cynipidae.

Holcaspis Arizonica, n. sp.—Gall globular, 9 mm. diam., pale ochreous, not shiny, attached to the base of the petiole of a leaf of *Quercus Arizonica*, Sargent. There is a projecting point next to the place of insertion. Within, the gall is brown, fibrous, moderately dense, at least dithalamous.

Fly emerging April 19, two females. Body $3\frac{1}{2}$ mm. long, wings $3\frac{2}{3}$ mm.; antennæ 2 mm., 15-jointed, joint 3 considerably the longest. Length of joints in μ : (3.) 360, (4.) 240, (5.) 200, (15.) 170. The joints, especially the apical ones, with fine longitudinal ridges, between which are rows of minute punctures. Head ferruginous; thorax and abdomen piceous; margins of mesothorax, and two spots on scutellum, dull ferruginous; legs bright ferruginous; anterior tibiæ with an apical projection; anterior tibial spurs bent; claws of all the legs falciform, with a large triangular basal tooth. Outer parapsidal grooves failing anteriorly. Scutellum a large rounded hairy eminence, without grooves. Sides of thorax, and abdomen except upper basal portion, with much glittering white hair. Abdomen with a short ferruginous hairy projection beneath; ovipositor not visible. Naked portion of abdomen smooth and polished, hairy portion minutely tessellate, with a tendency to oblique grooves, only visible with a compound microscope. Wings strongly clouded on apical half, nervures piceous, areolet present.

Hab.—Prescott, Arizona, 1902. Collected by the writer. Closely related to *Cynips sulcatus*, Ashmead, but differs by its much darker colour and infuscated wings. It seems to go best in *Holcaspis*.

Cecidomyiidae.

Lasioptera carbonitens, n. sp.—Gall shaped something like a long onion bulb, consisting of an aborted shoot of a grass not identified. The gall is entirely similar to that on *Brachypodium silvaticum*, figured by Rübssaamen in *Ent. Nach.*, XXI. (1895), p. 16. Fly emerged April 21.

♀. Shining coal-black; red patches at bases of wings; bases of all the femora, but especially the hind ones, pallid with a reddish tint; halteres pale reddish, shining; head small; antennæ short, 2 + 16 jointed; abdomen wholly without spots; ovipositor retractile; wings hyaline, iridescent, with black hairs and heavily-scaled black margins; closed wings reaching about to end of abdomen. Length a little over 2 mm., wings $1\frac{1}{2}$ mm.

Hab.—Las Valles, N. M., near the Gallinas River, 1902.

Lasioptera ephedricola, n. sp.—Gall a resinous elongate lateral brown swelling of a twig of *Ephedra trifurca*. Flies emerge second week of March.

♂. Similar to *L. ephedrae*, but abdomen with basal and apical white bands on the fifth segment, but otherwise hardly banded. Legs dark brown. Costa without a white spot. ♀. Costa black, with a white mark; thorax with three black vittæ joined in front; abdomen with ten white spots. Antennæ: ♂, 2 + 18 jointed; ♀, 2 + 20 jointed.

The anchor-process of the larva resembles that figured by Rübsaamen, in Bull. Soc. Nat., Moscow, 1895, Plate XVI., Fig. 25, but it differs in detail, being broader and shorter, with the two processes of the head only about half as long, and at least twice as far apart. The sides of the head are also much more bulging. (The anchor-process of *Lasioptera Willistoni* differs from both of these in having a large quadrate elevation between the processes.)

Hab.—Mesilla Park, N. M., 1900.

Cecidomyia, n. sp.—Galls on *Lycium Torreyi*. ♀. Eyes united on vertex; antennæ 2 + 15 jointed; head and thoracic dorsum very dark brown, abdomen mostly crimson; legs and antennæ very dark brown. Mesilla Park, N. M.

Cecidomyia, n. sp.—In dry stems of *Amarantus Palmeri*, not forming a distinct gall. Larva orange; anchor-process with the head terminating in two large sharp teeth, and the sides of the head produced into long sharp teeth. Adult unknown. Mesilla Park, N. M.

BOOK NOTICE.

FOSSILE SCHMETTERLINGE UND DER SCHMETTERLINGSFLUGEL, by A. Radcliffe Grote. Verhandl. der K. K. Zool.-bot. Gesellschaft in Wien, Heft 9, Jahrgang, 1901. With figure in text.

The author alludes to a general difficulty in tracing descent, arising out of the movements of animals. The butterflies had a special cause for such shifting of territory at the time of the glacial epochs; as previously shown by the author before the Am. Ass. Adv. Sci. in 1875, the effect of these migrations may be traced in the geographical distribution of *Eneis semidea* at the present time. Not only the obscurity of the fossil remains of Lepidoptera, but a want of detailed knowledge of the neuration itself, made the earlier determinations uncertain; the wings are often the best preserved portions of fossil specimens and thus the importance of their close study becomes obvious. The author recapitulates his

principal results in the specialization of the lepidopterous wing (1896-1900) and claims that by applying these tests in connection with the zoological principle of convergence (previously very generally neglected by writers on the Lepidoptera) he has been able to give a clearer picture of the development of the butterflies and a firmer, more natural classification than any offered by others. The preface to the new Palearctic Catalogue, by Staudinger and Rebel, recognizes this fact, saying that "for the retention of the Papilionids at the beginning of the Rhopalocera, and for the arrangement of this group altogether, Grote's recent phylogenetic studies are authoritative" (l. c., p. X.). By showing from his wing-studies, a parallelism in development of the two main lines he separates in the butterflies, the author believes he has terminated the controversy as to whether the Papilionids or Nymphalids are "highest." In demonstrating that the *Papilionides* are a closed, the *Hesperiades* an open, group to the moths, the sequences adopted among others by Hübner, H.-S., Meyrick, Hampson, Scudder, Reuter and the Philadelphia List* are invalidated. We were, indeed, "familiar," as recently stated in print, with the commencement by *Papilio* in catalogues, as well as in works of Linné, Fabricius, Boisduval, W. H. Edwards, etc., but we were *not* previously "familiar" with its proper reason, which it is the aim of science to expose. It will be more correct, however, in future to inaugurate the Papilionid series with *Parnassius*, this showing the most specialized structure. The Papilionid forms which mimic Nymphalids, and they are many, are younger than the forms they copy.

The author has shown that in the Pieri-Nymphalid stem, the Pierids are the ascending and neurationally more advanced group, while in the Lycæni-Hesperiids, belonging to the same main line, the Blues take up the corresponding position. A synthetic type has been detected by the author in *Nemeobius*, proving the identity of the line itself. In the first main line, that of the Papilionides, the Parnassians are the more advanced and presumably the more modern group, while *Ornithoptera*, contrary to received opinion, has proved to be the more generalized form (cf. Proc. Am. Phil. Soc., Oct., 1899). The present paper under review elucidates some discrepancies in nomenclature between the new Catalogue and the final results of the author on the classification of the butterflies as

*"Dr. Skinner has placed the Nymphalidæ at the head of the Rhopalocera, and, in my opinion, correctly so."—Ed. Phil. Check List. The list commences with the Limnads, which are generalized forms, of which fact neither Dr. Skinner or the editor seem to have been aware.

given in the second part of the Syst. Lep. Hild., published April 19, 1900. It is probable that but for these publications the new Catalogue would have begun with the Nymphalidæ.

A discussion of the homology of the second radial branch in the Pierids with reduced radius follows the author's expressed preference for the amended Redtenbacher-Comstock system of notation for the veins. According to Spuler, the second radial branch in *Pieris* should be notated $2 + 3$, but a fusion of these branches is not demonstrated in the pupal wing. Grote's theory of the movement of the radial branches is, that they pass off by the tip of the wing. This is true especially for 2 to 5. Now, in *Pieris* the second radial remains in its original generalized position, near R_1 , above the cell. It does not seem probable that R_3 could ever move backwards to fuse with R_2 . The reduced radius of *Pieris* receives compensatory mechanical support through the advance here of the first median branch from below. In the Nymphalids, where the radius is never reduced and remains in a generalized five-branched condition, the upward movement of the median branches is stayed.

The paper closes with a brief summary of the fossil remains of Lepidoptera published. These remains, though too few to be decisive, favour the author's view, as to the butterflies, that the Nymphalids and Hesperians represent older groups of the line to which they belong. The nearer relation between the two has been made evident by the author's discovery of the "long fork" in *Charaxes* (c. f. Proc. Am. Phil. Soc., 1898, 39), which indicates the way in which a wing of the Hesperid type may have passed into one of the type of wing shown by the brush-footed butterflies. A resemblance is shown also in the generalized radius and the consequent unwillingness of the median branches to leave the cross-vein. All these observations tend to support a mechanical source for the changes in the neurulation.

The author considers the Lepidoptera to be a relatively younger branch of the insects. The possible conclusion to be drawn from their fossil remains is, that from Tineid-like forms existing in the middle period of the earth's history there was a rapid development in the Tertiaries, where we meet with butterflies already quite like the Nymphalids and Skippers of the present day. The meagreness of the material precludes the formation of any final opinion.—*Communicated*.

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EDITED BY

REV. C. J. S. BETHUNE,

LONDON, ONTARIO.

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1902.

EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

LEPIDOPTERA.—I would like to correspond and exchange with some new beginners. PHINIUS WHITING, 106 Fairmount St., Lowell, Mass., U. S. A.

LEPIDOPTERA.—Superb examples of *Hemileuca tricolor*, *Catocala chelidonia* and *babayaga*, *Pam. pythou*, *Apatura leilia* and other extreme rarities in exchange for species of equal interest. O. C. POLING, Quincy, Ill.

LEPIDOPTERA.—Eggs and imagoes of Catocalæ and Sphingidæ of the world wanted. Choice Southern and Western butterflies in exchange. Address: EDWIN LANSING, JR., Salem, Ore., U. S. A.

I WILL make collections of Lepidoptera in the Mississippi Valley in exchange for specimens of other localities. Address: G. H. ROSS, Burlington, Iowa.

WILL COLLECT insects of all orders from this locality for entomological publications not in my library. REV. J. W. STACEY, Clarksville, Mich.

WANTED.—Psyche, Vol. IV., parts 138 to 140, and Index; Vol. V., parts 145 to 148. Will exchange any parts of Vols. 1, 2 and 3 for these. R. F. PEARSALL, 1334 Dean St., Brooklyn, N. Y.

BRACHYNINI.—Specimens from all parts of the world wanted. GERMAIN BEAULIEU, P. O. Box 2168, Montreal, Canada.

ARGYNNIDS WANTED.—Arg. *atlantis*, *electa*, *leto*, *cypris* and *aphrodite*. Have numerous duplicates for exchange, chiefly amongst Noctuidæ. F. H. WOLLEY DOD, Box 225, Calgary, Alberta.

WANTED.—Lepidoptera from Canada and U. S. A., in papers, correctly named, in exchange for Lepidoptera of the world, correctly named. W. NEUBURGER, Halensee-Berlin, Lutzenstrasse 10, Germany.

WANTED.—Fresh specimens of all the species of *Andrena* to be met with in various localities in North America north of Mexico; this for the purpose of working over the genus. Address: L. BRUNER, care University of Nebraska, Lincoln, Neb.

HYDRÆCIA.—Will exchange larvæ, pupæ and imagoes of *H. rutila* for other species of this genus. A. F. WINN, 58 Bruce Ave., Westmount, Que.

PLUSIAS WANTED.—Having just described some new Plusias, all from females, I wish to obtain males of these and specimens of others in which my series is short. Very liberal returns. DR. R. OTTOLENGUI, 80 West 40th Street, New York.

EUROPEAN COLEOPTERA.—I have a large quantity of European Coleoptera which I wish to exchange for American. Lists furnished. PAUL J. ROELOFS, 90 Rue van Straelen, Antwerp, Belgium.

TENTHREDINOIDEA.—Sawflies from all parts of Canada desired for study, with view to publication of catalogue. Material will be returned or exchanges made. W. HAGUE HARRINGTON, P. O. Dept., Ottawa.

WILL COLLECT any order this season in Pennsylvania and New Jersey, in exchange for Hymenoptera—unmounted. Wanted just as it comes from the field—especially Siricoidea, Tenthredinoidea, Ichneumonoidea, and Evanioidea. J. CHESTER BRADLEY, 2221 Spring Garden St., Philadelphia, Pa.

WILL COLLECT in any order in exchange for Coleoptera and Lepidoptera (Noctuina specially). CHARLES STEVENSON, 906 St. Urbain Street, Montreal, Que., Canada.

N. A. LEPIDOPTERA desired. Those willing to collect, in exchange for European specimens, please communicate with JAMES McDUNNOUGH, Kleist Str. 42, Berlin, Germany.

LEPIDOPTERA.—Pupæ and imagoes of nearly all N. Am. Sphingidæ and imagoes of Arctians desired in exchange. HENRY ENGEL, P. O. Box 369, Pittsburg, Pa., U. S. A.

WANTED.—Erycinidæ of the world. Also butterflies from the Western and North-western States. Offer Diurnes from Central and South America, in faultless condition. LEVI W. MENGEL, Boys' High School, Reading, Pa.

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No. 8

WHAT IS A GENUS?*

BY HENRY H. LYMAN, MONTREAL.

This question is one that it is extremely difficult to answer satisfactorily.

The great naturalist, Agassiz, in his Essay on Classification, wrote: "Genera are most closely allied groups of animals differing * * * simply in the ultimate structural peculiarities of some of their parts."

The Century Dictionary defines genus as "a classificatory group ranking next above the species, containing a group of species (sometimes a single species) possessing certain structural characters different from those of any others." It goes on, however, to say: "The value assigned to a genus is wholly arbitrary—that is, it is entirely a matter of opinion or current usage what characters shall be considered generic and thus constitute a genus; and genera are constantly modified and shifted by specialists, the tendency being mostly to restriction of genera, with the constant multiplication of their numbers, and the coinage of new generic names. A genus has no natural, much less necessary, definition, its meaning being at best a matter of expert opinion; and the same is true of the species, family, order, class, etc."

It will doubtless be readily granted, however much we may differ as to generic values, that at least all the individuals of the same species should belong to the same genus, but this, unfortunately, is not always the case, as some species vary sufficiently in structure to run into two or more genera, as these are frequently defined.

Having had the good or bad fortune to find about the middle of August, 1898, a mature larva closely resembling that of *E. Oregonensis*, though differing in colour, from which I bred on 1st of April, 1899, a moth so closely resembling *E. Egle†* that probably 99 men out of a 100

*Read before the Montreal Branch, 13th May, 1902.

†The question whether the generic name *Euchætes*, proposed by Harris, or *Euchætiæ*, proposed by me, should be used for the genus of which this moth is the type, I am willing to leave to the principal authorities on such matters to decide, but wish to say what I perhaps did not make sufficiently clear in my note on page 52 (correcting my error in regard to the name I proposed for a genus in the Coleoptera), that in giving Mr. Henshaw's views upon the subject, as conveyed to me by letter, I did not mean it to be inferred that I accepted or concurred in them.

would pronounce it to be that species, I naturally became very much interested.

I carried the moth with me to Washington, where it was carefully examined by Dr. Dyar, who pronounced that it belonged to the genus *Pygarctia*, as it had an accessory cell.

Before venturing to describe it, I determined to obtain as many of the species of the group as possible, and through the kindness of Mrs. Slosson was able to add a specimen of *Pygarctia Abdominalis* to my collection, and obtained by purchase several other species.

In Neumoegen and Dyar's "Preliminary Revision of the Bombyces of America north of Mexico," published in 1893-94*, all the moths for which the name *Euchætetes* had been used were embraced in Hübner's genus *Cycnia*, which that author had also used for *Hyphantria Cunea*, but in September, 1897, Dr. Dyar published in the CANADIAN ENTOMOLOGIST "A Generic Revision of the Hipocritidæ (Arctiidæ)," in which the moths in question were divided into three genera, *Cycnia* characterized as having "veins 7 to 10 of primaries stalked," *Pygarctia* with "accessory cell present," and *Euchætetes* "accessory cell absent," and in the list of genera and species these moths were distributed among these three genera as follows:

CYCINIA, Hübn.	<i>scepsiformis</i> , Graef.
<i>tenera</i> , Hübn.	<i>albicosta</i> , Walk.
<i>sciurus</i> , Boisd.	EUCHÆTES, Harris.
<i>insulata</i> , Walk.	<i>egle</i> , Dru.
PYGARCTIA, Grote.	<i>eglenensis</i> , Clemens.
<i>abdominalis</i> , Grote.	<i>Oregonensis</i> , Stretch.
<i>vivida</i> , Grote.	<i>perlevis</i> , Grote.
<i>murina</i> , Stretch.	<i>Spaguii</i> , Grote.
<i>Bolteri</i> , H. Edw.	<i>zonalis</i> , Grote.
<i>elegans</i> , Stretch.	

When, however, I came to study the venation for myself, I got into difficulties at once, as I found that while *Tenera* had the veins 7-10 stalked as described, *Abdominalis* had no accessory cell, while *Egle* had it. I therefore immediately wrote to Dr. Dyar, who admitted that he had

* Journal N. Y. Ent. Soc., I.-II.

evidently made an accidental transposition when first looking up the characters, and kindly sent me the results of his examination of the species as represented in the National Museum, as follows:

CYCNIA

<i>tenera</i>	no cell
<i>sciurus</i>	no cell
<i>cadaverosa</i>	no cell

PYGARTIA.

<i>abdominalis</i>	no cell
<i>vivida</i>	(not in collection)
<i>murina</i>	cell
<i>elegans</i>	cell
<i>scepsiformis</i>	cell
<i>Bolteri</i>	cell

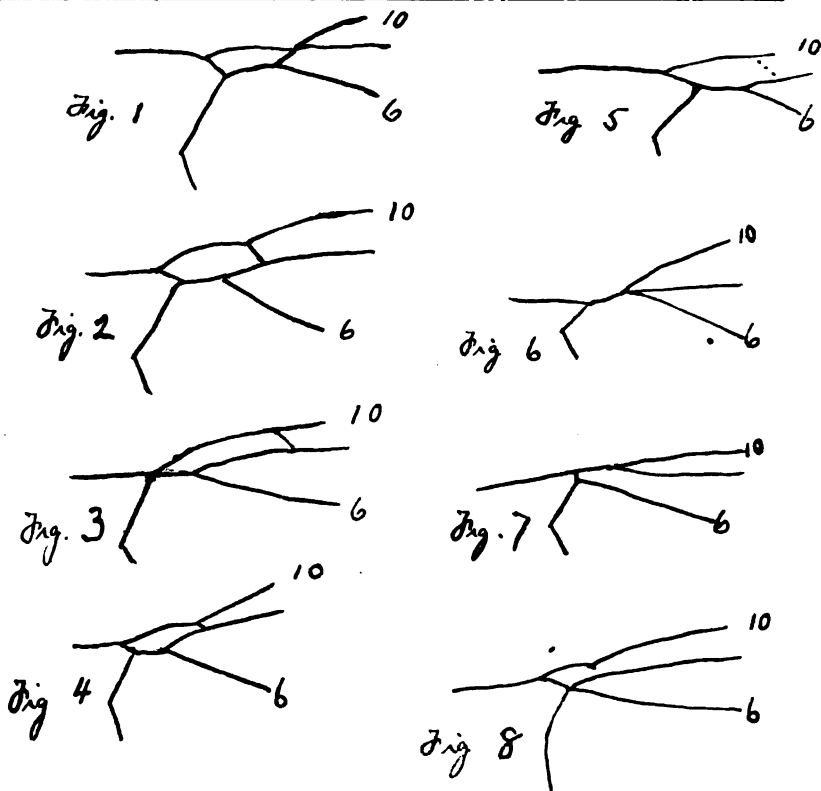
EUCHÆTES.

<i>egle</i>	cell
<i>eglenensis</i>	no cell
<i>pudens</i>	no cell
<i>Oregonensis</i>	no cell
<i>perlevis</i>	no cell
<i>Spraguei</i>	no cell
<i>zonalis</i>	(not in collection)

and suggested my transferring *Murina*, *Elegans*, *Scepsiformis* and *Bolteri* to Euchætes, and *Eglenensis*, *Pudens*, *Oregonensis*, *Perlevis* and *Spraguei* to Pygarcia. But when I came to examine my series of *Egle*, and found such an extraordinary range of variation both as to the presence or absence of the cell, and also as to the venation, I came to doubt whether any of these characters were sufficiently constant as to be of generic value.

I found an occasional specimen lacking the accessory cell, and several with it present on one side and absent on the other, as well as great variation in the branching of the veins.

When I had the pleasure of a visit from Dr. Dyar, April 23rd-24th, 1901, prior to his trip to Colorado, I showed him my series of *Egle*, and from an examination under a microscope he kindly drew for me the sketches from which the accompanying illustrations of venation have been prepared.



NOTES ON ILLUSTRATIONS.

No. 5.—The wing on the other side has the cell present.

No. 6.—The wing on the other side has a small cell present.

The specimens represented in the other figures are approximately the same on both sides.

From these figures it will be seen how many genera could be founded upon a few of my specimens of this common and well-known species.

When a common species is found to vary greatly in this way, it is fair to infer that an examination of an equal number of each of the other species in the same genus would probably disclose as surprising variations, and it therefore becomes of the highest importance that in founding new genera every available specimen should be carefully examined to see whether the characters proposed to be used for differentiation are sufficiently constant to warrant the erection of a new genus upon them, and authors should invariably state the number of specimens which they have examined for this purpose. If this were done we should have fewer genera, but they would be more satisfactory.

Sir George Hampson deals with these species in the third volume of his work on the moths of the world as represented in the British Museum, but uses a different arrangement from either of those used or suggested by Dr. Dyar, dividing them among the three genera, *Ammalo*, Walk.; *Pygarctia*, Grote, and *Euchætes*, Harris, which he characterizes according to the following table :

GENERA AS USED AND DEFINED BY SIR GEORGE F. HAMPSON, BART.

Ammalo, Walk.	Pygarctia, Grote.	Euchætes, Harris.
Poboscis fully developed.	Proboscis aborted, minute.	Proboscis aborted, minute.
Palpi upturned, not reaching vertex of head, the third joint short.	Palpi porrect, extending to just beyond frons.	Palpi porrect to just beyond the frons.
Antennæ of male bipectinate, with rather long branches, of female with short branches.	Antennæ of male bipectinate, with the branches short.	Antennæ bipectinate, with moderate branches in male, with very short branches in female.
Tibiæ with spurs moderate.	Tibiæ with spurs short, fore tibiæ with curved apical claw.	Tibiæ with spurs moderate.
Abdomen dorsally clothed with rough hair at base.	Abdomen smoothly scaled.	
Fore wing with veins 3, 4, 5 from angle of cell; 6 from upper angle; 7, 8, 9, 10 stalked; 11 free.	Fore wing with vein 3 from close to angle of cell; 4, 5 from angle; 6 from upper angle; 7, 8, 9 stalked; 10, 11 from cell.	Fore wing with vein 3 from close to angle of cell; 4, 5 from angle; 6 from upper angle; 7, 8, 9 stalked; 10, 11 from cell.
Hind wing with vein 3 from close to angle of cell; 4, 5 from angle; 6, 7 from upper angle; 8 from beyond middle of cell.	Hind wing with veins 3, 4 from angle of cell; 5 from just above angle; 6, 7 from upper angle; 8 from towards end of cell.	Hind wing with veins 3, 4, 5 from angle of cell; 6, 7 from upper angle; 8 from beyond middle of cell.

Leaving out those species not found in America north of Mexico, the following is his arrangement :

AMMALO, Walk.

Insulata, Walk. (Halesidota), = *Pareuchaetes Cadaverosa*, Grote.

Tenera, Hübn., = *Sciurus*, Boisd.

Eglenensis, Clem.

PYGARCTIA, Grote.

Spraguei, Grote.

Vivida, Grote.

Abdominalis, Grote.

Elegans, Stretch.

EUCHÆTES, Harris.

Antica, Walk. (Halesidota), = *Zonalis*, Grote.

Albicosta, Walk. (Phragmatobia), = *Scepsiformis*, Graef.

Perlevis, Grote.

Murina, Stretch.

Bolteri, Stretch.

Egle, Drury.

Oregonensis, Stretch.

Pudens, H. Edw.

It should be noted that the genus *Ammalo* is not regarded as being at all closely related to *Pygarctia* or *Euchætes*, but rather very much separated from them. It is treated of on pp. 82-86, while *Pygarctia* is described on pp. 415-417, and *Euchætes* on pp. 417-420.

Whether a fuller examination of a larger series of these moths would not again upset their arrangement and necessitate a new classification, the future alone can tell, but I feel very strongly that far too much classificatory work is done on very insufficient material, and after too superficial a study of the material available.*

*In Ent. News, XIII., 192, reference is made to *Psychophora Fasciata*, Skinner, one specimen of which received by Dr. Dyar was found to agree with the *N. cruidæ* in venation, while the next one received had the venation typical of the *Geometridæ*, thus showing the sometimes unsatisfactory nature of these characters.

A NEW COCCID FROM CALIFORNIA AT A VERY HIGH ALTITUDE.

BY EDW. M. EHRHORN, MOUNTAIN VIEW, CAL.

Exaretopus caricis, n. sp.

Adult ♀ salmon pink, shiny, about 2 mm. long and 1 mm. broad, elongate oval. Legs and antennæ light brown. ♀ secretes a mass of cotton all over her body, becoming so dense as to completely envelope the entire body, looking more like an elongated *Eriococcus*. This secretion extends caudad, forming a large egg-sac, which, including the whole insect, measures from 4 to 5 mm. Eggs salmon pink. Young larvæ orange colour. Adult ♀ after boiling in K. O. H. derm remains light brown. Margin beset with fine, short, straight spines, incisions having two stout curved spines. There are numerous short conical spines scattered over the derm with irregular rows of long fine hairs. Anal plates large and thick, each with four short, stout spines. Anal ring with six very long, stout hairs, which extend to caudal end of plates. Antennæ long, slender, tapering, 8-jointed. Joint 3 always longest and joint 7 always shortest, each joint with one or more fine hairs, joint 8 with several long hairs. *Formula*: 3.4. 5. 8. (1.2.) 6. 7.

	1.	2.	3.	4.	5.	6.	7.	8.
Measurements of joints in μ :	40.	40.	100.	55.	60.	32.	28.	48.
	40.	40.	80.	60.	50.	30.	24.	24.
	40.	40.	80.	60.	48.	32.	22.	36.
	40.	41.	100.	64.	52.	30.	25.	40.

Legs long and slender. Coxa about half as long as tibia and quite stout. Tibia very little longer than femur. Front tarsus two-jointed. Tarsal digitules long, fine, knobbed hairs about 56μ , those of claw stout, curved clubs, about 32μ . Legs not very hairy, trochanter with a long slender hair. Claw sharply curved.

Hab.—On stems of *Trisetum subspicatum*, (L.) Beauv., and *Carex Breweri*, Boott. Mt. Shasta, above timber line, September 3rd, 1901.

Note.—I have placed this interesting species in *Exaretopus* owing to its two-jointed tarsus. The only other species known is *E. formiceticola*, Newst. (The Ent. Mo. Mag., Vol. V., p. 204), and differs very much from the above species. *E. caricis* abandons the food-plant

at maturity and attaches itself to the under side of rocks, where the ♀ makes the ovisac and probably hibernates till spring, when the young larvæ crawl away in search of food. This is the first *Exæretopus* found in America, and is from the highest altitude at which any Coccid has been found, it being above timber line on Mt. Shasta, between 9,000 and 10,000 feet.

A NEW SAWFLY OF THE GENUS XYELA.

BY T. D. A. COCKERELL, EAST LAS VEGAS, N. M.

Mr. Ashmead has written thus of the Xyelidæ: "The imagoes appear very early in the year, or in February, March and April, deposit their eggs and then disappear, the consequence being that very few are taken, and only a few of the common forms are known." Of the genus *Xyela*, as now restricted, only one North American species, *X. minor*, Norton, has been described.

On May 1st of the present year, as we were going up to our classes in the Normal University at Las Vegas, N. M., my wife picked a small insect off my coat. It was at once transferred to the bottle which is never absent from the entomologist's person, and, upon inspection later, proved to be a new species of *Xyela*, herewith described:

Xyela luteopicta, n. sp.—♂. Length of body about $2\frac{1}{2}$ mm.; head and thorax variegated with black and bright yellow; abdomen black or nearly so above, yellow on venter; legs pale orange; antennæ with the first three joints reddish-brown, the other (filiform) joints black; wings very large, hyaline and iridescent, nervures black, stigma (very large) sepia. Antennæ 12-jointed, not hairy; head bright yellow, the occiput, a small spot just above level of antennæ, lines passing from the antennæ to the ocelli, the ocellar region, and a broad short longitudinal band on each side between the ocelli and the eyes, black. Thorax yellow ventrally; black dorsally, with a large yellow pentagonal area, on which are two black spots, a black V pointing anteriorly, and an anterior weaker V pointing posteriorly. On one side the wing is abnormal, one of the recurrent nervures being obliterated.

NEW CYCLORHAPHOUS DIPTERA FROM MEXICO AND NEW MEXICO.

BY D. W. COQUILLETT, WASHINGTON, D. C.

In the course of identifying a series of Diptera received by Dr. L. O. Howard, and collected in Mexico and New Mexico by Mr. C. H. T. Townsend, a number of new forms were encountered, and as manuscript names of these will soon be sent out it is desirable that these forms should be duly characterized; accordingly, the descriptions are presented for publication herewith.

Family SYRPHIDÆ.

Spilomyia obscura, new species.

Head black, the face, frontal triangle of male and lower part of front of female, prolonged upward along the eyes to a point nearly opposite the lowest ocellus, yellow; antennæ yellowish brown, the joints subequal in length, arista yellow, mouth-parts black; thorax black, a yellow spot on each humerus and a smaller one above it, a vitta extends from each postalar callosity obliquely to the suture, where it is prolonged inward as a silvery white streak; a pair of oblique yellow spots in front of scutellum, a yellow spot on posterior part of mesopleura, one on the sternopleura, one above front coxa and a small prominence beneath insertion of wing; scutellum wholly black; abdomen black, a yellow spot on each side of the first segment, an interrupted yellow fascia on anterior part of the second, broadly dilated at the sides, a yellow streak in each hind angle of this segment, third and fourth segments with a yellow fascia on the front part and another on the hind margin, the former interrupted on the third segment, sixth segment of female, except the front margin, yellow; coxæ black, a yellow spot on outer side of the hind ones; femora yellow, the posterior side, except at the ends, black, least extended on the middle ones; tibiæ yellow, their apices and the tarsi yellowish brown; wings hyaline, costal margin to the spurious vein brown; length, 15 to 17 mm. A specimen of each sex collected August 27th and September 11th.

Habitat.—Sierra Madre, Chihuahua, Mexico (head of Rio Piedras Verdes, altitude about 7,300 feet).

Type.—Cat. No. 6290, U. S. National Museum.

Ocyptamus notatus, new species.

Head black, the face and broad sides of frontal triangle yellow, antennæ and proboscis black; body black, the prealar and postalar callosities, sides of scutellum, except at base, and a pair of circular or

oval spots on abdominal segments two to four, yellow, the spots on the second segment located between the centre and the lateral margin, those on the other two segments situated slightly in front of the middle; abdomen widest at base, subopaque, becoming somewhat polished posteriorly; front legs yellowish brown, ends of tibiæ and first two joints of the tarsi yellow, middle and hind legs black, base of middle tibiæ, first two joints of their tarsi and first three joints of the hind ones, yellow; wings hyaline, tinged with brown along the costa, the base and stigma dark brown, the costal cell dark gray; length, 12 mm. Four males collected February 24th and March 3rd to 9th.

Habitat.—Frontera, Tabasco, Mexico.

Type.—Cat. No. 6291, U. S. N. M.

Lycastirrhyncha Willistoni, new species.

Head black, with a slight bluish tinge, front thinly gray pruinose, crossed at middle by a velvet black fascia prolonged backward in the middle and at each end, a transverse row of four velvet black spots on vertex; face on upper part and the sides yellowish-gray pruinose, prolonged on sides of snout almost to its middle; antennæ reddish yellow; eyes sparsely long haired on the upper part; body black, slightly tinged with bronze, thinly gray pruinose; mesonotum marked with three velvet black vittæ, the median one complex, the lateral ones interrupted at the suture, behind which they are double; scutellum velvet black on basal half, second and third segments of abdomen with a pair of large yellow spots narrowly separated from the lateral margin, remainder of these segments, except their narrow yellow hind margins, velvet black, narrow hind margin of fourth segment also yellow, this segment with three velvet black spots in the form of a triangle, two along the hind border and the other in the middle in front; legs black, the front and middle knees yellow, hind knees and first two joints of middle tarsi sometimes also yellow; wings hyaline; length, 7 to 8 mm. Three males collected February 12th to 14th.

Habitat.—Frontera, Tabasco, Mexico.

Type.—Cat. No. 6292, U. S. N. M.

Sphiximorpha ancoralis, new species.

Head black, upper edge of occiput, lower part of front, except a median line dilated at base of antennæ and prolonged laterally on the face, and the face, except a median vitta, yellow; antennal process slender, dark brown; antennæ brown, the joints subequal in length, the

first two-thirds as long as the antennal process; proboscis dark brown; body black, the humeri, antealar callosity, a short vitta above base of wing, large spot on posterior side of mesopleura, smaller one on upper part of sternopleura, small one on lower part of pteropleura, sometimes very indistinct, the scutellum, sides of first abdominal segment and posterior borders of the following three, yellow, that on the fourth only slightly and very gradually dilated in the middle; fourth segment marked with an interrupted gray pruinose fascia which is produced forward at the point of interruption, second segment as long as the third; legs reddish yellow, bases of the tibiæ broadly pale yellow; middle and hind femora, except their ends, sometimes dark brown, one or more of the joints of the tarsi sometimes also dark brown; wings hyaline, the costal border to the third vein pale brown, lightest in costal cell and in front of last section of third vein; length, 10 mm. Six males and five females, collected March 26th and August 24th to September 4th.

Habitat.—Las Cruces, New Mexico.

Type.—Cat. No. 6293, U. S. N. M.

Family CONOPIDÆ.

Myopa fenestrata, new species.

Head yellow, the front and occiput, except the sides and lower portion, orange yellow, sides of face each marked with two to four brown spots, the upper one contiguous to the eye, all rarely wanting, a brown stripe at each lower corner of front and five brown spots, two of which are near each eye on upper half of front, the fifth near centre of front, two or more of these spots sometimes coalesced; two brown spots near middle of each side of occiput, hairs of front and upper part of occiput black, on remainder of occiput, face and cheeks yellowish white, those on lower part of cheeks rather long and abundant; antennæ reddish yellow; palpi and first segment of proboscis black, remainder of proboscis reddish brown; body black, the inner part of the humeri, a streak behind each, a spot on each postalar callosity, several spots on pleura and the genitalia, reddish brown, a yellow stripe on either side of the metanotum; mesonotum thinly whitish pruinose, a distinct white spot near each corner and indications of a pair of whitish vittæ on the anterior portion, abdomen, except front angles of the segments, gray pruinose and with dark reflecting spots; legs black, coxæ marked with reddish, apices of femora, broad bases of middle and hind femora, bases and a median band on tibiæ, and whole of tarsi, yellow; base of wings to root of second

vein, extending along fifth vein to base of discal cell, bright yellow, remainder of wing from costa to fifth vein dark brown, a streak in outer half of discal cell, a fascia across middle of first posterior cell, sometimes interrupted, and nearly whole of second posterior cell, hyaline; wings behind fifth vein smoky gray; apex of first vein and the costa from apex of auxiliary to midway between apices of second and third veins, bright yellow; halteres yellow; length, 7 to 9 mm. Fifty-six specimens, of both sexes, collected August 11th to 27th.

Habitat.—Sierra Madre, Chihuahua, Mexico (head of Rio Piedras Verdes, about 7,300 feet altitude).

Type.—Cat. No. 6294, U. S. N. M.

Myopa pulchra, new species.

Differs from *fenestrata* as follows: Sides of face with only the uppermost brown spot, sides and hind margin of mesonotum, entire scutellum, broad sides of first two abdominal segments, front corners of the third and middle of the last segment, yellow; mesonotum marked with four velvet black vittæ; yellow on bases of wings more extended, including the fourth vein to base of discal cell, hyaline fascia of first posterior cell reduced to a subtriangular spot next to the fourth vein, wings behind fifth vein nearly pure hyaline; length, 8 mm. Five specimens, of both sexes, collected August 26th to September 2nd.

Habitat.—Same as the preceding species.

Type.—Cat. No. 6295, U. S. N. M.

Sicus brevisrostris, new species.

Face and cheeks pale yellow, front reddish yellow, the upper corners and occiput black, antennæ reddish yellow, inserted nearly length of last two joints from the adjacent eye, first and third joints slightly longer than broad, the second as wide as long, slightly shorter than the third, mouth-parts black, last section of proboscis less than one-third as long as the preceding section; body black, grayish pruinose, apex in male and whole of genitalia of female polished, second and third abdominal segments in the male in ground colour largely yellow; legs black, the knees yellow; wings hyaline, tinged with gray at the base and in the costal cell, first posterior cell closed and petiolate; halteres yellow; length, 4 mm. Four males and three females collected August 29th to September 7th.

Habitat.—Same as the preceding species.

Type.—Cat. No. 6296, U. S. N. M.

This European genus has not previously been recorded from this continent.

Zodion perlongum, new species.

Front and middle of upper part of occiput reddish yellow, remainder of occiput black, changing to yellow below, gray pruinose, face and cheeks light yellow, antennæ reddish yellow, first joint wider than long, the others slightly longer than wide, the second a trifle longer than the third, arista black, the apical half whitish, proboscis black; thorax and scutellum black, gray pruinose, mesonotum marked with two velvet black vittæ and with three dark vittæ between them and an interrupted one outside of each of the two black ones; abdomen narrower than, but fully twice as long as, the thorax, black, the second segment largely yellow, dorsum of abdomen yellowish-gray pruinose, the under side and last segment of genitalia polished; abdomen widest at base of second segment, tapering posteriorly to about half this width, segments two to four noticeably longer than wide, the third one and one-half times as long as wide; legs reddish yellow, upper sides of femora largely black, last tarsal joint dark brown; wings hyaline, tinged with gray at the base, halteres yellow; length, 8 mm. Four females.

Habitat.—White Mts., New Mexico (Rio Ruidoso, about 6,700 feet altitude, July 27th); Sierra Madre, Chihuahua, Mexico (head of Rio Piedras Verdas, about 7,300 feet altitude, August 26th); and Colorado (H. K. Morrison).

Type.—Cat. No. 6297, U. S. N. M.

Family TACHINIDÆ.

Comatacta, new genus.

Near *Siphosturmia*, but the antennæ reaching only slightly more than two-thirds of distance to the oral margin and the thorax densely covered with rather long yellowish and white hairs; head at vibrissæ longer than at base of antennæ, vibrissæ on a level with anterior edge of oral margin, one or two bristles above each, sides of face bare, each nearly half as wide as the facial depression, frontal bristles descending nearly to apex of second antennal joint, no ocellar bristles, two pairs of orbital bristles in the female, wanting in the male, third joint of antennæ slightly over twice as long as the second, arista pubescent toward base, the longest slightly longer than greatest diameter of arista, penultimate joint of arista broader than long, cheeks about one-sixth as wide as the eye-height, eyes bare, proboscis slender, the portion beyond the basal

articulation shorter than height of head, labella small, palpi short, clavate; hind tibiæ evenly ciliate with rather short bristles on the anterior-outer side; first posterior cell open, ending noticeably before the wing-tip, bend of fourth vein without an appendage, hind crossvein nearer to the bend than to the small crossvein, base of third vein bearing a single bristle, other veins bare.

Type.—*Brachycoma pallidula*, v. d. Wulp (Biol. Cent.-Am., II., p. 95), from Yucatan, Mexico. Five males and eight females are before me from San Rafael, Vera Cruz, Mexico.

Microphthalma pruinosa, new species.

Head yellow, occiput and sides of front black, the latter yellowish pruinose, frontal vitta brownish black; vertex one-third as wide as either eye, sides of face sparsely covered with black bristly hairs, antennæ nearly half as long as the face, yellow, the third joint, except at base, black, nearly twice as long as the second, vibrissæ near one-third of distance from anterior oral margin to base of antennæ, cheeks posteriorly about as wide as the eye-height, palpi yellow, proboscis dark brown; body wholly grayish pruinose, black, the broad sides of abdomen and the genitalia yellow, mesonotum marked with four black vittæ, three post-sutural dorsocentral bristles, three sternopleurals, second and third abdominal segments bearing marginal bristles, the fourth covered on the apical half; legs black, tibiæ largely yellow, pulvilli greatly elongate; wings hyaline, tinged with yellowish brown at base and along the veins, costal spine very long, a long stump at bend of fourth vein, calypteres whitish; length, 9 to 12 mm. Four males.

Habitat.—White Mts., New Mexico (South Fork Eagle Creek, altitude about 8,000 feet, August 13th); and Sierra Madre, Chihuahua, Mexico (head of Rio Piedras Verdes, altitude about 7,300 feet, July 19th).

Type.—Cat. No. 6298, U. S. N. M.

Araba nebulosa, new species.

Black, including the palpi; front golden-yellow pruinose, greatly narrowed anteriorly, vertex three-fourths as wide as either eye, uppermost frontal bristle in each row over twice as far from the one in the opposite row as from the adjacent eye, a reclinate bristle between it and the eye, two pairs of orbital bristles, sides of face bearing a row of short black hairs near the eye, ridges bristly on the lower three-fifths, frontals descending to middle of second antennal joint, antennæ slightly shorter than the face, the third joint four times as long as the second, arista

thickened nearly to the middle; thorax gray pruinose, marked with five black vittæ, the three median ones reaching slightly beyond the suture and appearing confluent when viewed from behind, three pairs of post-sutural dorsocentral bristles, two sternopleurals, scutellum gray pruinose, the sides broadly velvet black, abdomen gray pruinose, the first three segments with a transverse row of five velvet black spots, broad apex of the fourth segment polished, second and third segments with a marginal pair, the fourth with a marginal row of bristles; first joint of front tarsi shorter than the second and greatly thickened, the lower outer angle bearing a cluster of rather long yellow bristly hairs, pulvilli one-third as long as the last tarsal joint, hind tibiæ outwardly somewhat ciliate with bristles of an unequal length; wings hyaline, a small brown spot at apex of first vein, a larger one at small crossvein, prolonged toward apex of discal cell, a narrow one in outer lower corner of this cell, a large spot at apex of second vein and on bend of fourth vein, the latter furnished with a rather long appendage, the vein beyond it nearly straight, terminating a short distance before the extreme tip of wing; length, 5 mm. Four specimens collected May 31st.

Habitat.—Sierra Madre, Chihuahua, Mexico (head of Rio Piedras Verdes, altitude about 7,300 feet).

Type.—Cat. No. 6299, U. S. N. M.

Family DEXIDÆ.

Trixodes, new genus.

Head in profile nearly hemispherical, front rather prominent, face strongly retreating below, facial depression nearly elliptical in outline, a rather low, broad median carina, vibrissæ absent, vibrissal angles widely separated, situated the length of the antennæ above the anterior oral margin, ridges bare, antennæ less than one-fourth length of face, the second and third joints of nearly an equal length, arista bearing a few hairs, the longest of which are nearly twice as long as greatest diameter of arista, penultimate joint of the latter as broad as long, frontal bristles descending nearly to middle of second antennal joint, ocellar and post-ocellar bristles small or wanting, only one pair of verticals, sides of face on upper half bare, the remainder and the cheeks sparsely covered with short bristly hairs, cheeks four-fifths as wide as the eye-height, eyes bare, proboscis one-fourth as long as height of head, rather robust, labella small, palpi short clavate; bristles of tibiæ very short, hind tibiæ not ciliate with bristles; third vein bristly on the basal fourth of first section,

other veins bare, first posterior cell open, ending far before the wing-tip, hind crossvein much nearer bend of fourth vein than to small crossvein, this bend angular and without an appendage, costa bare, no costal spine. Type, the following species :

Trixodes obesa, new species.

Dark brown, apex of palpi yellow; vertex of male as wide as either eye, in the female one and one-fourth times as wide, no orbital bristles; head, except the frontal vitta, thinly grayish pruinose, mesonotum thinly gray pruinose, marked with four black vittæ, bristles very short, five pairs of postsutural dorsocentral bristles, abdomen very thinly grayish pruinose, the bristles very short, marginal ones on the third and sometimes on the second segment; front pulvilli of male rather elongate, but much shorter than the last tarsal joint; wings hyaline, the base as far as base of discal cell pale brown, crossveins faintly clouded with brown; calypteres brown; length, 16 to 19 mm. Two males and two females.

Habitat.—Sierra Madre, Chihuahua, Mexico (head of Rio Piedras Verdes, September 9th); and West Fork Gila River, New Mexico (July 13th).

Type.—Cat. No. 6300, U. S. N. M.

Mochlosoma rufipes, new species.

Black, the antennæ, face, cheeks, palpi, humeri, scutellum, femora and tibiæ reddish yellow, frontal vitta deep brown, with a tinge of yellow; vertex as broad as either eye, two pairs of orbital bristles, sides of front and face, except the lower part, densely gray pruinose, upper-inner fourth of face sparsely covered with short bristly hairs, antennæ two-fifths as long as the face, the second joint as long as the third, arista long plumose, cheeks three fourths as broad as the eye-height, proboscis setaceous, the portion beyond the articulation twice as long as height of head; mesonotum gray pruinose and with five blackish vittæ, scutellum thinly, abdomen densely, gray pruinose, the latter with dark olivaceous reflecting spots, second and third segments with discal and marginal bristles, the fourth sparsely covered, except on the extreme base; wings hyaline, the base whitish, bend of fourth vein arcuate, calypteres white; length, 13 mm. Eight females.

Habitat.—Sierra Madre, Chihuahua, Mexico (head of Rio Piedras Verdes, about 7,300 feet altitude, September 5th to 18th).

Type.—Cat. No. 6301, U. S. N. M.

CLASSIFICATION OF THE FOSSORIAL, PREDACEOUS AND
PARASITIC WASPS, OR THE SUPERFAMILY
VESPOIDEA.

BY WILLIAM H. ASHMEAD, A. M., ASSISTANT CURATOR, DIVISION OF INSECTS,
U. S. NATIONAL MUSEUM.

(Paper No. 7.—Continued from p. 166.)

FAMILY XXIX.—Eumenidæ.

To this family belong the potter wasps. They differ from the paper-making wasps in being solitary and in constructing their nests of mud or clay, instead of macerated woody fibre or pulp. It is perhaps one of the largest, if not the largest, families in the Vespoidea, and is well represented in all parts of the world by many genera and species.

The species superficially resemble the Vespidæ, but are quite distinct and are easily distinguished by the cleft or toothed claws, the claws never being simple or edentate as in the social wasps.

The family, like the Vespidæ, has reached its greatest development in warm or tropical countries.

Our knowledge of this family, as well as of the *Vespidae* and *Masaridae*, is due mainly to the labors of the distinguished Swiss entomologist, Henry de Saussure, who has for more than half a century devoted most of his time to elucidating the groups, genera and species. He has done more work on these families than any other man, living or dead, and all of his papers should be in the hands of those who contemplate studying these wasps.

His greatest work, "Etudes sur les Vespides," in 3 Vols., 8 vo., with plates, was published during the years 1852 to 1856, and treats of the *Eumenidæ*, *Vespidae* and *Masaridae*.

These "Etudes" are typical of the best kind of systematic work, and should afford a model for us all to strive to imitate.

All wasps belonging to the family *Eumenidæ* are predaceous principally upon Lepidopterous larvæ, but a few attack also the larvæ of sawflies belonging to the superfamily Tenthredinoidea. Although most of these wasps prey upon Lepidopterous larvæ as do the social wasps, yet in their habits they are quite different. The social wasps chew up or macerate their food before feeding to their young, which they carefully

watch and constantly feed during all stages of larval development. The potter wasps, on the contrary, act quite differently.

A potter wasp will go off, catch a caterpillar, sting it into insensibility, and then carry it off to its mud cell. This operation is repeated again and again, or until eight or a dozen or more caterpillars have been captured and stored away in its cell. An egg is then deposited on this fresh food, the cell is hermetically closed, and the mother wasp has finished her labours once and for all, and she cares no more for her still unborn offspring.

The young larva of a potter wasp receives no attention from its mother; on hatching, it finds sufficient fresh food at hand in the semi-paralyzed caterpillars stored up in the cell, and is able to care for itself.

I have recognized in the *Eumenidæ* four distinct subfamilies :

Table of Subfamilies.

1. Middle tibiæ with *two* apical spurs... .. 2.
 Middle tibiæ with *one* apical spur... .. 3.
2. Second cubital cell receiving both recurrent nervures.
 Second cubital cell oblong or quadrate, not or only slightly narrowed above ; claws with a tooth near the middle... .. Subfamily I.—*Ischnogasterinæ*.
 Second cubital never oblong or quadrate, always *much* narrowed above ; claws cleft... .. Subfamily II.—*Discoelinæ*.
 Second and third cubital cells each receiving a recurrent nervure... .. Subfamily III.—*Raphiglossinæ*.
3. Second cubital cell receiving both recurrent nervures... .. Subfamily IV.—*Eumeninæ*.

SUBFAMILY I.—*Ischnogasterinæ*.

The two spurred middle tibiæ separate this subfamily from the *Eumenidæ* ; the second cubital cell receiving *both* recurrent nervures, separates it from the *Raphiglossinæ*, which have the second and third cubital cells each receiving a recurrent nervure ; while from the *Discoelinæ*, to which it is closely allied, it is separated by the shape of the second cubital cell, which is oblong or quadrate, and by the claws, which have a tooth at or near the middle, beneath.

Table of Genera.

Clypeus elongate, rounded or triangular anteriorly, but *not* dentate ;
mandibles long Ischnogaster, Guérin.
(Type I. fulgidipennis, Guér.)

Clypeus subemarginate or bidentate anteriorly ; mandibles oblong,
narrowed, dentate Ischnogasteroides, Magretti.
(Type I. flavus, Magr.)

SUBFAMILY II.—Discoelinae.

This group was first separated by Thomson, who called it a tribe.
It is readily recognized by the cleft claws and by the shape of the second
cubital cell.

Table of Genera.

1. Labial palpi three-jointed 2.
Labial palpi four-jointed 6.
2. Petiole of abdomen swollen at the middle, and more or less contracted
at both ends ; antennæ inserted just above the clypeus 3.
Petiole of abdomen elongate, contracted or slender only at the base ;
antennæ inserted on the middle of the face 5.
3. Second abdominal segment not contracted into a distinct petiole at
base 4.
Second abdominal segment contracted into a distinct petiole at base ;
expansion of the petiole globularly lengthened. Didymogastra, Perty.
(Type D. fusca, Perty.)
4. Second abdominal segment subsessile or very briefly
petiolate Zethusculus, Saussure.
(Type Zethus Jurinei, Sauss.)
Second abdominal segment sessile or subsessile, enlarged gradually ;
clypeus transverse, lozenge-shaped, forming a sharp lateral angle
on each side Heros, Saussure.
(Type Zethus gigas, Spinola.)
5. Mandibles short, obliquely truncate Calligaster, Saussure.
(Type C. cyanopterus, Sauss.)
6. Petiole neither short, polished, nor campanulate 7.
Petiole short, polished, campanulate 9.
7. Mandibles short, stout 8.
Mandibles rather long, obliquely truncate and 4-
dentate Discoelius, Latreille.
(Type Vespa zonalis, Panz.)

8. Petiole elongate, linear ; mandibles obliquely truncate ; clypeus wider than long *Elimus*, Saussure.
(Type *E. australis*, Sauss.)
- Petiole elongate, but not linear, either clavate or subclavate, narrowed towards base ; second cubital cell angulate above... *Labus*, Saussure.
(Type *L. Humbertianus*, Sauss.)
9. Clypeus transverse ovate, much wider than long, the anterior margin medially bidentate *Stroudia*, Gribodo.
(Type *S. armata*, Gribodo.)

SUBFAMILY III.—Raphiglossinæ.

In this subfamily the middle tibiæ have two apical spurs as in the two previously-defined subfamilies, but from these it is at once separated by the venation of the front wings, the second and the third cubital cells each receiving a recurrent nervure. In the other subfamilies the second cubital cell receives both recurrent nervures.

Table of Genera.

1. Mandibles short, 4-dentate ; labial palpi 3-jointed, the joints long 2.
Mandibles long, somewhat pointed and not distinctly dentate ; labial palpi 4-jointed. 3.
2. Abdomen subsessile, the first segment not long ; labium not especially long ; maxillary palpi 6-jointed *Stenoglossa*, Saussure.
(Type *Raphiglossa odyneroides*, Saussure.)
- Abdomen petiolate, the first segment long ; labium very long ; maxillary palpi 5-jointed *Raphiglossa*, Saunders.
(Type *R. eumenoides*, Saund.)
3. Abdomen petiolate ; labium short ; maxillary palpi 6-jointed, the joints short *Gayella*, Spinola.
(Type *G. eumenoides*, Spinola.)

SUBFAMILY IV.—Eumeninæ.

To this subfamily belong all Eumenids having the middle tibiæ with a single apical spur. The second cubital cell receives both recurrent nervures.

It is the largest and most extensive group in the family, and many genera and species are known.

I have divided it into three minor groups or tribes, which may be recognized by the characters employed in the following table :

Table of Tribes.

Second cubital cell not petiolate, although often narrowed or angulate above; mandibles most frequently long, acute, and when united forming a long beak, the teeth lateral.

Abdomen distinctly petiolate.....Tribe I.—Eumenini.

Abdomen sessile or subsessile, never distinctly

petiolate.....Tribe II.—Odynerini.

Second cubital cell distinctly petiolate.....Tribe III.—Alastorini.

TRIBE I.—Eumenini.

This tribe is separated from the *Alastorini* by the non-petiolate second cubital cell, and from the *Odynerini* by the distinctly petiolate abdomen, the species being, as a rule, narrower, more elongate, and less robust.

Table of Genera.

1. Maxillary palpi 3-jointed; antennæ inserted on the middle of the face.....2.

Maxillary palpi 6 jointed.....3.

2. Mandibles rather long and narrow, with blunt teeth on the inner margin; anterior angles of pronotum not acute.....Montezumia, Saussure.

(Type *M. rufidentata*, Sauss.)

3. Labial palpi 4-jointed; second abdominal segment not constricted into a petiole at base, or, at the most, subpetiolate; clypeus longer than wide.....4.

Labial palpi 3-jointed; second abdominal segment constricted into a petiole at base; head large, quadrate, the clypeus wider than long.....Zethus Fabricius.

(Type *Vespa coeruleopennis*, Fabr.)

4. Mandibles at apex 3- or 4-dentate.....5.

Mandibles at apex *bidentate*.....6.

5. Mandibles long, 4-dentate, the teeth, however, usually indistinct; clypeus at apex usually truncate; petiole long; third cubital cell irregular.....Eumenes, Fabricius.

(Type *Vespa coarctata*, Linné.)

Mandibles 3-dentate, the teeth acute; clypeus at apex *bidentate*; petiole long, subclavate, a little longer than the thorax; third

cubital cell quadrate or nearly; front angles of pronotum acute.
(Liberia, Africa)..... *Micreumenes*, Ashmead, g. nov.
(Type *M. Curriei*, Ashm. MS.)

6. Petiole of abdomen rather short; wings very
large..... *Pachymenes*, Saussure.
(Type *P. sericea*, Sauss.)

TRIBE II.—ODYNERINI.

Into this tribe fall the vast majority of the known genera and species belonging to the subfamily *Eumeninae*. They are easily recognized by the sessile, or, at most, subsessile abdomen, and by their shorter, stouter, more robust form.

Table of Genera.

1. Abdomen with the first segment quite differently formed, neither distinctly funnel-shaped nor subcampanulate, often truncate at base.....2.
Abdomen with the first segment funnel-shaped or subcampanulate, subbidentate medially; maxillary palpi 6-, labial palpi 4-jointed..... *Nortonia*, Saussure.
(Type *Odynerus intermedius*, Sauss.)
2. First abdominal segment above, near the base, *without* a transverse carina.....3.
First abdominal segment above, near the base, *bounded* by a transverse carina.....11.
3. Maxillary palpi 5-jointed or less.....12.
Maxillary palpi 6-jointed.....4.
4. Labial palpi 3-jointed.....5.
Labial palpi 4-jointed.....7.
5. Labial palpi neither very long nor plumose.....6.
Labial palpi very long, plumose; mandibles distinctly 4- or 5-dentate..... *Pterocheilus*, Klug.
(Type *P. Pallasii*, Klug.)
6. First joint of maxillary palpi very large, much swollen, almost as long as the following joints united; last joint of the labial palpi very small; ♂ antennæ simple.... *Abisba*, Mitchell.
(= *Monerebia*, Sauss.)
(Type *Vespa ephippium*, Fabr.)

First joint of maxillary palpi not much swollen and much shorter than the following joints united; last joint of the labial palpi not especially small; ♂ antennæ enrolled at apex. . . *Micragris*, Saussure.

(Type *M. spinotæ*, Sauss.)

7. Clypeus *not* transverse, as long or longer than wide. 8.

Clypeus transverse, wider than long; labial palpi and paraglossæ very slender. *Leptochilus*, Saussure.

(Type *Pterochilus mauritanus*, Lepel.)

8. Last three joints of maxillary palpi normal, not very small; labial palpi and paraglossæ not especially slender. 9.

Last three joints of maxillary palpi very small. . . *Rhynchium*, Spinola.

(Type *Vespa oculata*, Fabr.)

9. Mesonotum *without* distinct parapsidal furrows, either wanting or only vaguely defined basally; ♂ antennæ at apex ending in a hook or spirally contorted. 10.

Mesonotum *with* usually distinct parapsidal furrows; ♂ antennæ at apex simple. *Odynerus*, Latreille.

(Type *Vespa murarius*, Latr.)

10. Thorax coriaceous or closely finely punctate; clypeus at apex usually semicircularly emarginate, bidentate; antennæ widely separated at base, in ♂ at apex depressed and spirally contorted; mandibles 2- to 3-dentate. *Hoplomerus*, Westwood.

(Type *Vespa spinipes*, L.)

Thorax punctate, not coriaceous; clypeus at apex truncate or subemarginate; antennæ not widely separated at base, in ♂ ending in a hook; first abdominal segment dorsally at apex with a short median groove; second ventral segment produced and truncate at base; mandibles 4-dentate. *Leionotus*, Saussure.

(Type *Odynerus humeralis*, Hal.)

11. First abdominal segment truncate at base, not divided by a longitudinal groove or furrow; antennæ in ♂ ending in a hook.

Maxillary palpi 6-jointed. *Ancistrocerus*, Westwood.

(Type *Vespa parietum*, Linné.)

Maxillary palpi 5-jointed. *Monobiella*, Ashmead, gen. nov.

(Type *Vespa atrata*, Fabr.)

First abdominal segment somewhat funnel-shaped, and divided above by a deep longitudinal groove; antennæ in ♂

simple. *Symmorphus*, Wesmæel.

(Type *Vespa sinuata*, Fabr.)

- TRIBE III.—Alastorini.

Table of Genera.

1. Abdomen sessile or subsessile 2.
 Abdomen distinctly petiolate 3.
2. Mandibles long, acute, bluntly dentate within; maxillary palpi
 6-jointed; labial palpi long, 4-jointed, the last joint minute.
 First abdominal segment *without* a transverse suture or fur-
 row Alastor, Lepeletier.
 (Type *A. atropos*, Lepel.)
 First abdominal segment *with* a transverse suture or fur-
 row Alastoroides, Saussure.
 (Type *Alastor clotho*, Lepel.)
3. Form slender; thorax elongate Smithia, Saussure.
 (Type *S. natalensis*, Sauss.)

THE MAPLE COTTONY PHENACOCCLUS.

BY GEO. B. KING, LAWRENCE, MASS.

Phenacoccus acericola, n. sp.

Since 1880, when the above-named species was found and described as the European *Pseudococcus aceris*, Geoff. (*Phenacoccus*), by Miss Emily A. Smith, it has until recently been supposed to have been that species.

The latter part of 1890, Prof. Cockerell wrote me that he believed our species was distinct from that of Europe, and suggested that I should describe it as new if upon further investigation no reason appeared to the contrary. At the meeting of the Association of Economic Entomologists of 1891, at Denver, Colorado, he speaks of it as being without a name.

As I knew of no place in the vicinity where I live, I asked Dr. George Dimmock, of Springfield, Mass., if he would kindly collect and send me some specimens for study, which he did last season. The following description is from the material sent, together with some descriptive notes taken from Dr. Howard's excellent account given in "Insect Life." The first account of the *Maple Cottony Phenacoccus* appeared in the "North American Entomologist," April, 1880, by Miss Emily A. Smith. The second was by Prof. Comstock in his work published in the annual report of the U. S. Department of Agriculture for 1881, and the third by Dr. Howard in "Insect Life," 1894. It seems quite evident that Dr. Howard had some doubt about the identity of the species, and calls attention to some of the characters which seemed to differ from Signoret's account of the European *Phenacoccus aceris*, Geoff.

Our American species when seen on the leaves appear as an irregular oval cottony mass which adheres to anything touching it and resembles very much the cottony ovisac of a *Pulvinaria*. The cottony material is about 6 mm. in diameter and covers the insect and her eggs.

Length of ♀ about 5 mm. long, 3 broad, plump, light yellow. Boiled in caustic potash, they turn orange red. The internal juice pressed out, the skin is colourless. The upper surface of the body is more or less covered with spinnerets and these are more dense at the posterior extremity. The margin of the body has several groups of short spines. Antennæ 9 jointed, measuring in μ :

Joints	1.	2.	3.	4.	5.	6.	7.	8.	9.
	44.	44.	44.	30.	40.	32.	32.	28.	64.
	44.	44.	44.	32.	44.	32.	28.	28.	64.

Joint 9 is longest, 3 and 5 equal, 6 and 8 usually equal, 1 and 2 and 3 are equal and longer than any of the next five joints. The last sending in the fall, when the leaves were found on the ground, had well advanced females with their abdomen well filled with eggs, and when cleared with potash they showed only an 8 jointed antenna as follows:

Joints (1) 40. (2) 60. (3) 48. (4) 72. (5) 40. (6) 40. (7) 28. (8) 60.

Middle leg, coxa 120, femur and trochanter 240, tibia 200, tarsus 80. The legs are somewhat slender, and the claws are thin, sharp, thickened at the back, but not toothed as described by Prof. Comstock.

Distribution.—So far as known to me, the following are the only localities where the species have been found:

Peoria, Ill., Miss Emily A. Smith; Lancaster, Pa., Dr. Rathvon; Mount Carmel, Illinois, Prof. W. G. Johnson; Kingston, R. I., Prof. L. F. Kinney; New Jersey, Dr. John B. Smith; Cumberland, Maryland, Prof. W. G. Johnson; Albany, Athens, Brooklyn and Middleton, N. Y., Prof. E. P. Felt; Jamaica Plain and Brookline, Mass., Mr. John G. Jack; Springfield and Holyoke, Mass., R. A. Cooley.

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U. S. Agricultural Report, 1880, I., p. 345.

Insect Life, Vol. VII., p. 235-240, 1894.

Bulletin No. 17, N. Sr., U. S. Dept. of Agr., 1898.
p. 61; No. 31, 1902, p. 67.

Bulletin N. Y. State Muse., No. 46, Vol. IX., p.
355, 1901.

New York State Entom. Rpt., 151-616.

THE EGG OF THE WATER SCORPION (*RANATRA FUSCA*).

BY R. H. PETTIT, AGRICULTURAL COLLEGE, MICH.

In his "Insect Book," Dr. L. O. Howard states that the egg of *Ranatra* has not as yet been described from the United States. It is hoped that the following note may be of interest to someone:

On June 24, 1900, the writer was so fortunate as to find a large number of these eggs at Pine Lake, near Lansing, Mich. As the eggs were not recognized at first, they were allowed to hatch, and the nymphs allowed to become about half-grown.

The eggs are white in colour, long oval in form (about $3\frac{1}{2}$ mm. long), with two long spindle-like appendages (about 4 mm. long) at one end. The surface is nearly smooth, not glossy, and covered with many slightly raised rounded elevations, visible when greatly magnified. The eggs are placed quite abundantly in the rotting stems of reeds and cat-tails, several inches under the surface of the water, the egg itself usually being almost out of sight, only the appendages being noticeable. Where they are numerous, the effect is that of a small cheval-de-frise.

No connection seems to exist between the interior part of the egg and the processes. The latter seem to be appendages of the outer shell alone, and their purpose that of protection against predatory vertebrates.

The young nymph is provided with a short anal process at birth. This process is deeply grooved on the ventral surface.



FIG. 11.



FIG. 12.

Fig. 11 shows a piece of aquatic plant with the eggs slightly enlarged in situ. Fig. 12 shows several of the eggs magnified about $4\frac{1}{4}$ times.

LIFE-HISTORY OF *LYDA FASCIATA* (NORTON), FAM. TENTHREDINIDÆ.

BY RICHARD F. PEARSALL, BROOKLYN, N. Y.

Full-grown larvæ were taken on wild cherry (*Prunus*) in the latter part of September, 1901. Placed in a box over earth, they fed but a day or two, turned a deep green, and, entering the earth two to three inches, formed rounded cells, in which they remained as larvæ all winter, transforming to pupæ just before emergence. They are gregarious, remaining in their web, filled with its mass of exuvia, until full-grown, when, as their growth is completed, individually they drop from it and enter the ground. One which was kept under observation formed a pupa on April 28th, and emerged eight days thereafter. The pupal skin is very thin, showing distinctly the parts of the enclosed imago. This brood commenced emerging April 25th, and a few individuals are still coming out, May 31st. In the earlier days the males predominated, later the females. Altogether, 134 males and 123 females have appeared. Copulation took place at once, the pair remaining in coitu from three to five hours. One female (the first observed) was furnished with a spray of wild cherry, and on the night of the 13th of May deposited 76 eggs on the under side of a leaf, extending from the tip half its length. They were laid side by side, in rows of five to seven, from midrib to margin, and in little slits cut in the epidermis of the leaf, being attached by a gummy secretion.

Egg.—Size 1.5 x .5 mm. Sordid white, glossy, and apparently smooth, opaque.

Hatched May 22nd, turning to a bright yellow the day before. The young larvæ do not eat the egg shells.

First Stage.—Head round, shining, black at vertex, face and mouth-parts paler, eyes black. Body dull orange, deeper along an enlarged substigmatal wrinkled fold, which extends the entire length, giving the body a flattened appearance. Thoracic feet and anal plates black. Above the eyes are movable 3-jointed antennal-like processes, already mentioned by Packard (5th Report U. S. Entom. Commission), his figure, without doubt, referring to this species. Attached to the sides of the upper anal plate are two similar processes, but apparently 5-jointed. The young larvæ immediately congregate and begin to spin a web, attaching another leaf, if possible, to form their domicile, and attack the edges of the leaf, consuming all parts of it. Length, .12.

May 23. Second stage.—Head darker, a depression on the face between the eyes. Otherwise unchanged. Length .16.

May 25. Third stage much as before. Length .21.

May 27. Fourth stage.—In this stage the black colour of the head, ventral plates, thoracic feet and antennal appendages is intensified. The substigmatal fold becomes thicker and more solid in colour. The spiracles and a series of broken yellowish lines on each segment subdorsally make a faint lateral stripe, dorsally and sublaterally translucent dull greenish. Length .33.

May 29. Fifth stage.—Much the same as before. One larva discovered moulting. The head apparently splits apart vertically at the mouth without previous visible distension.—After moult the skin is partially eaten, but the head-covers remain in the web. The body of the larva retains its normal colours, but the head and ventral plates with their appendages are glassy and colourless, except the eyes, which are black, and a faint tinge of black about the mouth, and remains so for several hours after moult. Length .56.

May 31. Sixth stage.—A decided thickening of substigmatal fold, which now becomes a reddish orange. The broken markings above it and the subdorsal lines are also heavier and more solid in colour. Translucent intervals darker and presenting a slightly shagreened appearance. Instead of being rounded, the upper ventral plate now has a central triangular depression, in the bottom of which is set a short movable spine. This space is dusky yellow. The lower ventral plate has a depression on each side of a rounded longitudinal ridge, with the bottom confusedly punctured. Edge of both plates set sparsely with strong, black setæ. Length .84.

June 12. Seventh stage.—Much as before. Body strongly wrinkled. Thoracic legs and antennal appendages now translucent greenish, ringed lightly with black at the joint. Length, 1.15.

June 14. Eighth stage.—Not changed, except that the thoracic legs are ringed with orange. The tubercles on the 11th segment have increased in size with later moults, but none others seem prominent. Length, 1.35.

After feeding two days without further moult, the larvæ as they mature turn a deep green, except the head and anal plates, which remain shining black, feet translucent. At this time they drop from the web and enter the ground for æstivation, there being in our section a spring and fall

brood. These larvæ, if placed on any flat surface, turn on their backs and begin at once to web the body fast to it, pushing themselves along under the web with the aid of the folds of the body and the jointed appendages of the anal plates. From my observations I believe this to be the purpose for which these appendages are supplied, supplemented at later stages, when its body becomes heavier, by the spinous process placed on the *upper* anal plate. After falling from the web and seeking to enter the ground, it assumes the normal position, hitching itself along on its ventral surface with the aid of its head and thoracic legs.

Some of the larvæ of the 1901 brood remain unchanged in their cell at this date, June 16th, and, I presume, will not appear as imagoes until the autumn, thus insuring, as do lepidopterous larvæ, a perpetuation of the species.

LARVA OF DATANA FROM ARIZONA IDENTIFIED.

In the March number of THE CANADIAN ENTOMOLOGIST, page 74, I described a, to me, unknown larva, which, according to a statement of Mr. Wm. Beutenmuller, of the American Museum of Natural History of New York, is that of *Datana robusta*, Strecker. Heretofore the imagoes of *D. robusta* had all been taken in Texas, and Dr. Dyar in Prof. Packard's *Bombycine Moths*, Vol. I., page 120, is quoted as saying that the larva of *Robusta* was yet unknown. Some have claimed that the species described as *Robusta* too much resembled *Perspicua*, but it will be seen that the larva is distinct, and the imagines of both these species are entitled to the names as first described. The body colour of *Robusta* larva is *black*, and the lines are *yellow*. *Perspicua* larva has a body of *straw* or *lemon yellow* and eleven *pitchy reddish* lines in the 3rd or 4th stage, and in the 5th stage the body is of the same colour, but the lines are *blackish red*, according to Mr. James Angus. In the third stage of *Perspicua* larva, as described by Dr. Dyar, the body colour is *dark red* and the stripes *bright yellow*.

Mr. Beutenmuller wishes it to be known that he alone is responsible that these two larvæ were not turned over to Mr. L. H. Joutel for figuring. He was on the point of departing from the city, and the larvæ having already contracted, he did not think they would then serve the purpose.

R. E. KUNZE, Phoenix, Arizona.

NOTES ON CICINDELÆ IN NORTH CAROLINA.

BY EDWARD D. HARRIS, NEW YORK.

In the early part of May of the present year (1902) the writer made an attempt to collect Cicindelæ in the pine belt of North Carolina. While opportunities for observing the distribution of species were too meagre to be of much practical value, certain facts were noted that may be of interest to those studying the genus.

The first locality visited was Jamestown, a station on the line of the Southern Railway, distant about 220 miles from the coast and 40 from the Virginia line. On the sand bars and banks of Deep River, a tributary of Cape Fear River, beautiful specimens of *repanda* were taken in abundance. A single *duodecimguttata* and a single *vulgaris* of the typical size were taken on the same ground, and a few specimens of *sexguttata*, both six- and eight-spotted, on sandy paths along the wooded banks of the river.

At High Point, in the woods eight miles distant, *repanda*, *sexguttata* and *vulgaris* occurred, a single specimen of the latter being noticeable for its small size. Charlotte, the next point visited, 15 miles from the South Carolina line, afforded in its suburbs excellent collecting ground. Along the edges of a creek of formidable dimensions, that showed unmistakable evidences of often breaking through its bounds, *repanda* and *duodecimguttata* were taken, the former in an unusual range of size. Here also occurred *vulgaris* in abundance, most of the specimens in both sexes being so small as to warrant special notice. Many of the males were scarcely larger than the typical *repanda*, and the average in size falls so far below that of the species as generally noted as to indicate the existence here of a sub-race. The maculations are noticeably attenuated, and in some of the specimens there appears a distinct tendency to their obliteration. The humeral lunule is generally either broken or the anterior portion wholly absent.

The three collecting points heretofore noted are west of, and not to be considered as included in, the pine belt of the State. Hamlet, 75 miles to the east of Charlotte, and less than 10 miles from the South Carolina line, is in the heart of the turpentine lands. Here the pine timber abounds—forests of magnificent trees, free from underbrush and plentifully watered.

At this point a most interesting form of *C. scutellaris* was taken. In colour it is somewhat suggestive of *rugifrons*, but, while being unicolorous, is not so intense a green or blue. The maculations, however, differ

from *rugifrons*. In the majority of specimens taken there is an apical lunule well defined, and sometimes the marginal dot appears. Other specimens are immaculate, and, were it not that they occur with those that are marked, would be placed as *C. unicolor*.

Vulgaris and *repanda*, the former of the typical size, were also taken at this locality.

In passing from Hamlet to the seacoast, 115 miles, one journeys directly through the pine district, which extends nearly the whole distance. There is little doubt that this form of *C. scutellaris* can be taken at numerous points over the entire field. At Montague, 17 miles from the coast, on sandy patches beneath the pine trees, although the weather was unfavourable, two specimens of the same insect were taken, having the apical lunule and small marginal dot.

Vulgaris was common here, the larger number of specimens being of the normal size.

The ocean beach opposite Wilmington was wholly bare of the genus.

Goldsboro' was the last collecting point on the trip. *Sexguttata* was taken here in the woods for the only time since leaving High Point. It appears to be absent in the pine belt. Here also occurred *modesta* and *vulgaris*, both in the roads, the latter of the dwarfed form found at Charlotte.

BOOK NOTICE.

THE COMMON SPIDERS OF THE UNITED STATES.—By J. H. Emerton;
Ginn & Co., Boston, Mass., 1902; 8vo., pp. 225, figs. 501.

This is a most welcome addition to the few books on the spiders of the United States. It is based on the author's previous papers on the New England spiders that have appeared during the past twenty years in the Transactions of the Connecticut Academy. Some species from the Southern States have been added, so that the work describes about 200 of the commoner spiders of the North-eastern United States, and Canada. There is an excellent introduction, which we wish were longer, and a short, general treatment of each family. Under the family each species is described in simple yet distinct language, and each species is figured. The abundance and excellence of these figures greatly enhance the value of the book, and make the determination of many of our common spiders a very easy matter. There are also many fine photographs of spider-webs, which indicate, as only photographs can, the beauty and complexity of these delicate structures. The classification adopted is that used by Blackwall many years ago, and the generic and specific names are sometimes out-of-date. The book is nicely gotten up, well printed, and with an appropriate cover-design representing a remarkable new genus of blind Thomisidæ.

NATHAN BANKS.

Mailed August 2nd, 1902.

The
Canadian Entomologist

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EDITED BY

REV. C. J. S. BETHUNE,

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EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

LEPIDOPTERA.—I would like to correspond and exchange with some new beginners. PHINIUS WHITING, 106 Fairmount St., Lowell, Mass., U. S. A.

LEPIDOPTERA.—Superb examples of *Hemileuca tricolor*, *Catocala chelidonia* and *babayaga*, *Pam. python*, *Apatura leilia* and other extreme rarities in exchange for species of equal interest. O. C. POLING, Quincy, Ill.

LEPIDOPTERA.—Eggs and imagoes of *Catocala* and *Sphingidæ* of the world wanted. Choice Southern and Western butterflies in exchange. Address: EDWIN LANSING, JR., Salem, Ore., U. S. A.

I WILL make collections of Lepidoptera in the Mississippi Valley in exchange for specimens of other localities. Address: G. H. ROSS, Burlington, Iowa.

WILL COLLECT insects of all orders from this locality for entomological publications not in my library. REV. J. W. STACEY, Clarksville, Mich.

WANTED.—Psyche, Vol. IV., parts 138 to 140, and Index; Vol. V., parts 145 to 148. Will exchange any parts of Vols. 1, 2 and 3 for these. R. F. PEARSALL, 1354 Dean St., Brooklyn, N. Y.

BRACHYNINI.—Specimens from all parts of the world wanted. GERMAIN BEAULIEU, P. O. Box 2168, Montreal, Canada.

ARGYNNIDS WANTED.—Arg. *atlantis*, *electa*, *leto*, *cypris* and *aphrodite*. Have numerous duplicates for exchange, chiefly amongst Noctuidæ. F. H. WOLLEY DOL, Box 225, Calgary, Alberta.

WANTED.—Lepidoptera from Canada and U. S. A., in papers, correctly named, in exchange for Lepidoptera of the world, correctly named. W. NEUBURGER, Halensee-Berlin, Lutzenstrasse 10, Germany.

WANTED.—Fresh specimens of all the species of *Andrena* to be met with in various localities in North America north of Mexico; this for the purpose of working over the genus. Address: L. BRUNER, care University of Nebraska, Lincoln, Neb.

PLUSIAS WANTED.—Having just described some new Plusias, all from females, I wish to obtain males of these and specimens of others in which my series is short. Very liberal returns. DR. R. OTTOLENGUI, 80 West 40th Street, New York.

EUROPEAN COLEOPTERA.—I have a large quantity of European Coleoptera which I wish to exchange for American. Lists furnished. PAUL J. ROELOFS, 90 Rue van Straelen, Antwerp, Belgium.

TENTHREDINOIDEA.—Sawflies from all parts of Canada desired for study, with view to publication of catalogue. Material will be returned or exchanges made. W. HAGUE HARRINGTON, P. O. Dept., Ottawa.

WILL COLLECT any order this season in Pennsylvania and New Jersey, in exchange for Hymenoptera—unmounted. Wanted just as it comes from the field—especially Siricoidea, Tenthredinoidea, Ichneumonoidea, and Evanioidea. J. CHESTER BRADLEY, 2221 Spring Garden St., Philadelphia, Pa.

WILL COLLECT in any order in exchange for Coleoptera and Lepidoptera (Noctuidæ specially). CHARLES STEVENSON, 906 St. Urbain Street, Montreal, Que., Canada.

N. A. LEPIDOPTERA desired. Those willing to collect, in exchange for European specimens, please communicate with JAMES McDUNNOUGH, Kleist Str. 42, Berlin, Germany.

LEPIDOPTERA.—Pupæ and imagoes of nearly all N. Am. Sphingidæ and imagoes of Arctians desired in exchange. HENRY ENGEL, P. O. Box 369, Pittsburg, Pa., U. S. A.

WANTED.—Erycinidæ of the world. Also butterflies from the Western and North-western States. Offer Diurnes from Central and South America, in faultless condition. LEVI W. MENGEL, Boys' High School, Reading, Pa.

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CLASSIFICATION OF THE FOSSORIAL, PREDACEOUS AND PARASITIC WASPS, OR THE SUPERFAMILY VESPOIDEA.

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(Paper No. 8.—Continued from p. 210.)

FAMILY XXX.—Masaridæ.

Prof. Westwood and others confused these wasps with the Vespidæ and the Eumenidæ, although Latreille had years previously established his family Masarides. Henry de Saussure, in his "Etudes," treats them as a tribe. They, however, represent a distinct family close to the Eumenidæ, but easily separated from them and the Vespidæ by the wings not being folded longitudinally, by peculiarities of the antennæ, which are usually strongly clavate at tip; by the wholly different abdomen, the venter being flatter; and by the much larger scutellum.

Of the habits of the Masarides nothing seems to be positively known. Some years ago Dr. Dyar gave me specimens of *Masaris vespoides*, Cr., bred from what I take to be the nest of an Odynerine, taken in Arizona.

Table of Genera.

1. Front wings with *two* cubital cells (Masarini) 3.
Front wings with *three* cubital cells (Euparagiini) 2.
2. Second cubital cell receiving both recurrent nervures; antennæ in ♀
short, clavate, ♂ unknown; scape not
long (1) Paramasaris, Cameron.
(Type *P. fuscipennis*, Cam.)
- Second and third cubital cells each receiving a recurrent nervure;
antennæ not clavate in both sexes, in ♂ subfiliform; scape very
long (2) Euparagia, Cresson.
(Type *E. scutellaris*, Cress.)

3. Labrum extensible..... 8.
 Labrum *not* extensible.
 Maxillary palpi wanting or rudimentary, or 3-jointed.....7.
 Maxillary palpi *not* rudimentary, 4- to 6-jointed; labial palpi
 4-jointed.....4
4. Maxillary palpi 4-jointed.....5.
 Maxillary palpi 6-jointed. Labial palpi stout, the last three joints
 united scarcely as long as the first; claws with a strong tooth
 beneath; mandibles 3-dentate.....(3) *Paragia* Shuekard.
 (Type *P. decipiens*, Shuck.)
5. First abdominal segment small; clypeus in ♂ transverse.....6.
 First abdominal segment nearly as long as the second; clypeus in ♂
 longer than wide; mandibles obliquely truncate, 3- or 4-den-
 tate.....(4) *Paraceramius*, Saussure-
 (Type *P. spiricornis*, Sauss.)
6. Abdominal segments *not* constricted at base; marginal cell *with* an
 appendage, the second cubital cell about twice as long as
 wide.....(5) *Ceramius*, Latreille.
 (Type *C. Fonscolombe*, Latr.)
 Abdominal segments constricted at base as in the genus *Cerceris*,
 Latr.; marginal cell *without* an
 appendage.....(6) *Ceramioides*, Saussure.
 (Type *C. cerceriformis*, Sauss.)
7. Second cubital cell subquadrate, not or scarcely longer than wide.
 Labial palpi 4-jointed; labium long; maxillary palpi rudimen-
 tary, 3-jointed; mandibles rather short and acute; claws
 unidentate.....(7) *Jujurtha*, Saussure.
 (Type *Celonites oraniensis*, Lepel.)
 Labial palpi 3-jointed; labium short, bifid; maxillary palpi
 wanting; mandibles somewhat acute at apex; claws
 simple.....(8) *Trimeria*, Saussure.
 (Type *T. Americana*, Sauss.)
8. Marginal cell *with* an appendage.....10.
 Marginal cell *without* an appendage.
 Eyes in ♂ normal, the lateral ocelli away from the eye margin..9.
 Eyes in ♂ abnormal, very strongly converging above or holoptic,
 the lateral ocelli touching the eye margin (♀ unknown).

Scape large, globular, the pedicel annular; flagellum very long, terminating in a large club, joints 1 to 5 elongate, slender, cylindrical, the first joint shorter than either joints 2 or 3 Masaris, Fabr. (partim).

(?) ♂ *M. Texana*, Cr., (?) g. nov.

9. Scape and pedicel large, globular, nearly equal; first joint of flagellum longer than either 2 or 3; labium long; maxillary palpi rudimentary, 3-jointed; mandibles short and acute; first joint of hind tarsi *not* as long as all the other joints united; claws with a tooth (9) *Celonites*, Latreille.

(Type *Vespa abbreviata*, Villers.)

Scape elongate, the pedicel small; flagellum in ♂ elongate, joints 2 to 6 elongate, cylindrical, subequal, in ♀ short, the first joint as long as 2-4 united, the latter being very short; first joint of hind tarsi elongate, as long as all the following united; claws simple, *without* a tooth (10) Masaris, Fabricius.

(Type *M. vespiformis*, Fabr.)

10. Scape not elongate, hardly thrice as long as thick, the pedicel annular; first joint of flagellum in ♀ as long as joints 2-3 united, in ♂ with joints 1 to 4 elongate; first joint of hind tarsi a little longer than all the following joints united, the second and third only a little longer than thick; claws long, simple (11) *Pseudomasaris*, Ashmead, g. nov.

(Type *Masaris occidentalis*, Cress.)

Scape elongate, about four times as long as thick, the pedicel hardly longer than thick; first joint of flagellum in ♀ not longer than 2-3 united; first joint of hind tarsi shorter than all the following joints united; claws very small (12) *Quartinia*, Gribodo.

(Type *Q. dilecta*, Gribodo.)

FAMILY XXXI.—Chrysididæ.

1825. Chrysides, Cinquieme Tribe, Latreille. Fam. Nat. Regn Anim., p. 448.
 1830. Chrysides, Tribe VIII., Leach. Edinb. Ency., IX., p. 146.
 1839. Chrysidæ, Fam. 18, Haliday. Hym. Syn., p. ii.
 1845. Chrysidiformes, Dahlbom. Hym. Enc., II., p. 2.
 1877. Chrysostilba, Tribe 13, Förster. Ueber d. Syst. Werth d. Flügeln. bei den Hym., p. 20

Abroad, the wasps belonging to this family are known as "ruby-tailed flies" and "gold-wasps."

Cuckoo wasps is a better name for them. They are among the handsomest of all wasps, being most frequently of a brilliant metallic green, blue-green, blue, purplish or cupreous; they are rarely wholly black, and still more rarely variegated with yellow or testaceous.

All the species are parasitic or inquiline, principally in the nests of bees and wasps. The potter-wasps (*Eumenidæ*) and the leaf-cutting bees (*Megachilidæ*, subfamily *Osmiinae*) are especially subject to their attacks; they have also been bred from the nests of other bees and wasps, and a few are said to have been bred from the larvæ of sawflies (*Tenthredinoidea*).

Dahlbom was among the first to separate the family into groups, which he called families. He established six families: (1) *Cleptidæ*, (2) *Elampidæ*, (3) *Hedychridæ*, (4) *Chrysididæ*, (5) *Euchræidæ*, and (6) *Parnopidæ*. All of these, except the *Euchræidæ*, are natural groups, recognized to-day as subfamilies, and he, and not Aaron and Mocsary, should receive credit for first pointing them out.

In 1889 an excellent monograph of this family, entitled "*Monographia Chrysidarum orbis terrarum universi*," was published by Alexander Mocsary, at Buda-Pesth, Hungary. It is a large 4to, of 643 pages, illustrated with two plates, gives a full bibliography of the family, tables for recognizing the subfamilies and genera, and terminates with a list of the hosts from which these wasps have been bred. It is the best work ever published on the family, and will be found indispensable to the student.

Mocsary, in this work, recognized seven subfamilies: (1) *Amiseginæ*, (2) *Cleptinæ*, (3) *Allocoelinæ*, (4) *Ellampinæ*, (5) *Hedychrinæ*, (6) *Chrysidinæ*, and (7) *Parnopinæ*.

In 1890, after this work had been published, Mocsary established another subfamily, the *Adelphinæ*, based upon a Mexican genus, *Adelphæ*, placing it next to the *Amiseginæ*. In my opinion this subfamily does not represent a natural group, and I have here merged it with the *Cleptinæ*.

It will also be observed that I have not followed Mocsary in his arrangement of the subfamilies. My reasons for this are simple. I believe the family *Chrysididæ*, through the *Cleptinæ* and the *Amiseginæ*, is quite closely allied to the family *Bethylidæ*, and by the arrangement here proposed, a very natural transition into this family is shown. The *Parnopinæ*, although very far removed, appear to me to approach nearest

to the *Masaridæ* and the *Eumenidæ*, and hence I begin with them, rather than with the *Amiseginæ*, as Mocsary has done.

This paper was ready for publication when I received the July No. of Zeitchr. f. Hym. n. Dipt., in which Mr. Adolphe Ducke has established a new subfamily, the *Pseudepyrinæ*, based upon a new genus discovered in Brazil.

This subfamily, judging from the description alone, is hardly justifiable, all the characters given, except those of the abdomen, agreeing with the *Allocoelinæ*, and I have here merged it with that subfamily.

Table of Subfamilies.

- Face more or less convex, never concave; prothorax quadrate, subtrapezoidal or longer than wide, and as long or longer than the mesonotum; abdomen depressed, subconvex or convex beneath, the female with 2 or 4 dorsal segments, the male with 4 or 5 segments.....3.
- Face more or less concave; prothorax transverse quadrate or rectangular, shorter than the mesonotum; abdomen concave beneath, with 3 dorsal segments, rarely with 4 segments in some males.
- Maxillæ and labium normal, the ligula subconical, the galea rounded, obtuse.....2.
- Maxillæ and labium abnormal, the ligula and galea very long, produced into a slender, filiform beak, resembling the proboscis of bees, and bent back under the thorax in repose; front wings with the discoidal cell distinct; abdomen in ♀ with 3, in ♂ with 4 segments, the last *without* pits or foveolæ, but with a broad deep submarginal furrow on each side of the apical half; apex of abdomen irregularly denticulate..... Subfamily I.—Parnopinæ.
2. Third abdominal *with* a submarginal series of pits or foveolæ, contained in a groove or declivity, the apical margin rarely unarmed, most frequently angulate, dentate or serrate; front wings with a distinct discoidal cell; claws simple... Subfamily II.—Chrysidinæ.
- Third abdominal segment *without* a submarginal series of pits or foveolæ in a groove or declivity, the surface therefore entire, smooth; front wings with the discoidal cell frequently wanting or incomplete; claws bifid, serrate or pectinate.

Front wings with the first and second discoidal cells usually more or less present and complete, or at least indicated by fuscous lines; apical margin of the last dorsal segment entire, very rarely undulate or more or less angulate laterally. Subfamily III.—Hedychrinæ.

Front wings with the first and second discoidal cells wanting, rarely with the second indicated by water lines; apical margin of the last dorsal segment medially excised or truncate—emarginate, rarely entire or subsinuate, scarcely excisely (*Philoctetes*) Subfamily IV.—Elampinæ.

3. Metathorax unarmed, the hind angles rounded. 4.

Metathorax with the hind angles acute or toothed; pronotum usually longer than wide, narrowed anteriorly, rarely quadrate.

Pronotum *without* a transverse furrow anteriorly; abdomen in ♀ with 2 or 3 dorsal segments, the apical margin of the last rounded, edentate; claws with one tooth beneath. Subfamily V.—Allocoelinæ.

Pronotum *with* a transverse furrow anteriorly; abdomen in ♀ with 4 dorsal segments, in ♂ with 5 segments. Subfamily VI.—Cleptinæ.

4. Pronotum broad, quadrate or subtrapezoidal, usually as long as the mesonotum, rarely a little shorter; abdomen much depressed, the known forms with 4 or 5 distinct dorsal

segments. Subfamily VII.—Amiseginæ.

SUBFAMILY I.—Parnopinæ.

The abnormally lengthened labium and maxillæ, as well as the venation of front wings and the peculiarities of the abdomen, render the subfamily easily recognized.

It is represented at present by a single genus, and all of the species apparently confine their attacks to wasps belonging to the family *Bombicidæ*.

Abdomen in ♀ with 3 segments, in ♂ with 4 segments, the terminal segment minutely denticulate at apex; postscutellum lamelliform, projecting; labium and maxillæ abnormally long Parnopes, Latreille.
(Type *Chrysis grandior*, Pallas.)

SUBFAMILY II.—Chrysidinæ.

This is the largest and most extensive group in the family. It is easily recognized by the simple, edentate claws, by the front wings having

a distinct discoidal cell, and by the abdomen, which is composed of only 3 visible segments, the third segment always having a groove or declivity before its apex, which is filled with pits or foveolæ, the margin being usually dentate or serrate, rarely simple or unarmed.

The wasps of this subfamily attack principally bees belonging to the families *Anthophoridae*, *Megachilidae*, *Andrenidae* and *Panurgidae*, and wasps of the family *Eumenidae*; they also attack those of the families *Pemphredonidae*, *Philanthidae*, *Larridae*, *Sphecidae* and *Scoliidae*.

Chryaspis, Saussure, described from Africa, I do not know, nor can I find out where it is described, the Zoological Record, and Dalla Torre, in his catalogue, being deficient in citing the publication. Both give Soc. Entom., II., 1887, p. 25. What entomological society?

Table of Genera.

- Head normal, not rostriform; postscutellum normal, the basal part *not* covered by the scutellum..... 2.
- Head rostriform, the frons narrowed; postscutellum conically produced, the basal part wholly covered by the scutellum.
- Postscutellar process excavated; third joint of antennæ *longer* than the fourth..... (1) *Stilbum*, Spinola.
(Type *Chrysis cyanura*, Forster.)
- Postscutellar process not excavated, convex; third joint of antennæ usually distinctly *shorter* than the fourth..... (2) *Pyria*, Lepeletier.
(Type *Chrysis lyncea*, Fabr.)
2. Apical margin of the third dorsal abdominal segment normal, or *without* a pellucid or subcoriaceous membrane..... 3.
- Apical margin of the third dorsal abdominal segment abnormal, composed of a pellucid or subcoriaceous membrane..... (3) *Spintharis*, Klug.
(Type *S. chrysonota* (Klug.), Dahlb.)
3. Front wings *with* a complete discoidal cell..... 4.
- Front wings *without* a complete discoidal cell..... 8.
4. Antennæ, legs and tibial spurs normal..... 5.
- Antennæ, legs and tibial spurs abnormal.
- Apical margin of the third abdominal segment 6-dentate; antennæ with the joints of the flagellum dilated..... (4) *Pleurocera*, Guerin.
(Type *P. viridis*, Guerin.)

5. Apical margin of third abdominal segment *not* finely denticulate, entire, notched, or terminating in from one to seven teeth... 6.
 Apical margin of third abdominal segment finely denticulate or with many teeth.
 Front wings with an *incomplete* marginal cell.
 Mesopleura bispinose..... (5) *Euchræus*, Latreille.
 (Type *Chrysis purpurata*, Fabr.)
 Mesopleura normal, unarmed..... Spinola, Dahlbom.
 Front wings with a complete marginal cell.
 Apex of abdomen with 11 small
 teeth..... (6) *Polydontus*, Radoszkowski.
 (Type *P. Stschurovskyi*, Radosz.)
6. Apex of abdomen not terminating in a tooth, entire, undulate, notched or angulate..... 7.
 Apex of abdomen terminating in from one to seven teeth.
 Apical margin of third abdominal segment terminating in 7
 teeth..... (7) *Heptachrysis*, Mocsary.
 (Type *Chrysis festina*, Smith.)
 Apical margin of third abdominal segment terminating in 6
 teeth..... (8) *Chrysis*, Linné.
 (= *Hexachrysis*, Licht.)
 (Type *Chrysis ignita*, Linné.)
 Apical margin of third abdominal segment terminating in 5
 teeth..... (9) *Pentachrysis*, Lichtenstein.
 (Type *Chrysis amœna*, Eversm.)
 Apical margin of third abdominal segment terminating in 4
 teeth..... (10) *Tetrachrysis*, Lichtenstein.
 (Type *Chrysis aeruyinosa*, Dahlb.)
 Apical margin of third abdominal segment terminating in 3
 teeth..... (11) *Trichrysis*, Lichtenstein.
 (Type *Chrysis cyanea*, L.)
 Apical margin of third abdominal segment terminating in 2
 teeth..... (12) *Dichrysis*, Lichtenstein.
 Apical margin of third abdominal segment terminating in a
 single central tooth..... (13) *Monochrysis*, Lichtenstein.
 (Type *Chrysis hybrida*, Lepel.)

7. Apical margin of third abdominal segment undulate, notched or angulate.....(14) *Gonochrysis*, Lichtenstein.
(Type *Chrysis albipennis*, Klug.)
- Apical margin of third abdominal segment
entire.....(15) *Olochrysis*, Lichtenstein.
(Type *Chrysis aerata*, Dahlb.)
8. Body narrow, slender.....(16) *Chrysogona*, Förster.
(Type *C. gracillima*, Förster.)

SUBFAMILY III.—Hedychrinæ.

This group is closely allied to the *Elampenæ*, where Aaron placed it, and probably the slight difference in venation used by Mocsary will not always prove satisfactory. The characters of the claws given by Dahlbom are entirely worthless to separate these wasps from the *Elampinæ*.

The third abdominal segment is always normal, *without* a groove or declivity filled with a submarginal series of pits or foveolæ, and this character separates the group from the *Chrysidinæ*; while from the *Elampinæ* it is usually easily distinguished by the venation of the front wings, the first and second discoidal cells being usually distinct, complete.

The wasps of this subfamily are most frequently bred from the nests of the *Pemphredonidæ* and *Trypoxylidæ*, although they attack other wasps, *Philanthidæ*, *Stizidæ*, and *Sphecidæ*. A few are also recorded from bees, *Megachilidæ*, *Andrenidæ*, *Panurgidæ*, etc.

Table of Genera.

1. Submedian cell *not* longer than the median, the transverse median nervure interstitial with the basal nervure.2.
Submedian cell longer than the median, the transverse median nervure originating beyond the basal nervure.
Claws with 4 or more teeth beneath; first and second discoidal cells distinct or indicated by fuscous
nervures.....(1) *Holopyga*, Dahlbom.
(Type *H. amœnula*, Dahlb.)
2. Claws with one small tooth beneath, at or near the middle; abdomen with the third segment at apex entire or broadly
sinuate.....(2) *Hedychridium*, Abeille.
(Type *Chrysis ardens* (Latreille), Coquebert.)

Claws cleft or bifid; abdomen with the third segment laterally rather strongly sinuate, and appearing more or less distinctly angulate (3) *Hedychrum*, Latreille.
(Type *Sphex nobilis*, Scopoli.)

SUBFAMILY IV.—Elampinae.

This group could only be confused with the *Hedychrinae*, the only available character to separate it from that group, and probably not a reliable character, being the apparent absence of discoidal cells in the front wings. I have examined many specimens, and in nearly all I can clearly detect these cells by hyaline veins, when examined through a bright light.

Table of Genera.

- Postscutellum seen from the side gibbous, convex, subconvex or obtusely produced, rarely subconical.....2.
Postscutellum seen from the side acuminate produced into a depressed blade or ledge.
Front femora towards base rectangularly dilated; abdomen with the third segment at apex medially most frequently strongly narrowed, reflexed and truncate; claws with 3-6
teeth.....(1) *Notozus*, Förster.
(Type *Hedychrum spina*, Lepel.)
2. Posterior tibiae normal.....3.
Posterior tibiae in ♂ dilated, compressed.
Abdomen with the third segment at apex undulate or rounded centrally, almost entire, very slightly sinuate, scarcely incised; pronotum declivous before; claws with 3
teeth.....(2) *Philoctetes*, Abeille.
(Type *Elampus micans*, Klug.)
3. Abdomen with the third segment at apex medially *not* truncate, and, viewed laterally, not forming a snout-like projection.....4.
Abdomen with the third segment at apex medially truncate, and, as viewed laterally, forming a snout-like projection that appears truncate; seen from behind, it is usually incised or emarginate below.
Surface of the third segment, just above the snout-like projection, produced into a cone-shaped piece forming the direct apex of

a fold which extends on each side just above the apical and lateral margins; claws with 2-3 teeth

within.....(3) *Diplorrhös*, Aaron.
(Type *D. plicatus*, Aaron.)

Surface of the third segment above the snout-like projection even, *not* produced; claws with two or more teeth; pronotum nearly regularly convex.....(4) *Elampus*, Spinola.
(Type *Sphex auratus*, Linné.)

4. Abdomen with the third segment at apex medially more or less distinctly excised; claws with 3-8 teeth
beneath.....(5) *Pseudomalus*, Ashm., g. nov.
(Type *Omalus semicircularis*, Aaron.)

Abdomen with the third segment at apex rounded, entire; claws with 3 teeth beneath.....(6) *Holophris*, Mocsary.
(Type *H. marginellus*, Mocs.)

SUBFAMILY V.—*Alloceîlinæ*.

This subfamily was established by Mocsary. It is allied to the *Cleptinæ*, but is easily distinguished by the absence of a transverse furrow on the pronotum, by the paucity of visible segments in the abdomen, there being only two or three, and by the claws, which are armed with a tooth beneath.

Ducke's recently-established subfamily *Pseudepyrinæ* seems to fall in here.

In the character of the pronotum, the group shows some affinity with the *Amiseginæ*, but from that group it is easily separated by the unidentate claws, the armed metathorax, and by the totally different shaped abdomen.

Table of Genera.

Pronotum twice wider than long; abdomen with three segments, the last with a finely elevated apical margin ..(1) *Pseudepyris*, Ducke.
(Type *P. paradoxa*, Ducke.)

Pronotum longer than wide, trapezoidal; abdomen with only two visible segments, the last with the apical margin rounded, edentate.....(2) *Allocoelia*, Mocsary.
(Type *Anthracia capensis*, Smith.)

SUBFAMILY VI.—Cleptinæ.

The acute or toothed hind angles of the metathorax separate this subfamily from the *Amiseginæ*, while from the *Allocelina*, to which it is most closely allied, it is separated by the pronotal differences, the pronotum in this group always being divided by a transverse furrow anteriorly.

In venation the group is practically identical with many forms in the family *Bethylidæ*, and this resemblance is so striking that quite recently an eminent French hymenopterist classified *Heterocælid*, Dahlbom, with the *Bethylidæ*.

All the species bred are recorded from the larvæ of sawflies (*Nematidæ*).

Table of Genera.

- Front wings with the first and second discoidal cells *distinct*, complete.....2.
- Front wings with the first and second discoidal cells *wanting* or incomplete.....3.
2. Eyes large, oval; antennæ *not* inserted on a tubercle; clypeus without a prominent carina; scutum of metathorax visible.....(1) *Cleptes*, Latreille.
(Type *Sphex semiaurata*, Linné.)
- Eyes small, rounded; antennæ inserted on a small tubercle; clypeus with a strong prominent carina its entire length; scutum of metathorax wanting.....(2) *Heterocœlia*, Dahlbom.
3. Pronotum quadrate, with a transverse arcuate furrow anteriorly; claws with a median tooth beneath.....(3) *Adelphe*, Mocsary.
(Type *A. mexicana*, Mocsary.)

SUBFAMILY VII.—Amiseginæ.

This small group is known at once by the metathorax being unarmed, the hind angles being always rounded, never acute. The pronotum is broad, quadrate, or nearly, usually wider than long, and as long as the mesonotum or a little shorter. The abdomen is much depressed, oval, the known forms having 4 or 5 distinct dorsal segments.

The species can be easily confused with genuine Bethylids, and the connection between these insects and the family *Bethylidæ* is very close.

Table of Genera.

Front wings with two discoidal cells, or at least these are indicated by fuscous streaks ; antennæ 13-jointed.

Pronotum as long or a little longer than the mesonotum, the latter without parapsidal furrows, but with a grooved line at sides just above the tegulæ ; abdomen with 5 visible dorsal segments ; marginal cell open at apex ; discoidal cells usually incomplete, indicated by fuscous

streaks.....(1) *Mesitiopterus*, Ashmead, n. g.
(Type *M. Kahl*i, Ashm.)

Pronotum shorter than the mesonotum, the latter with parapsidal furrows ; abdomen with 4 visible segments ; marginal cell closed ; discoidal cells distinct.....(2) *Amisega*, Cameron.
(Type *A. cuprifrons*, Cam.)

*Mesitiopterus Kahl*i, n. sp.

♂.—Length 3 mm. Head and thorax bronzed green, punctate, the metanotum smooth, with a median carina ; scape, pedicel and legs, except the middle and hind coxæ, rufous ; abdomen black, the first segment at apex and the large second segment, except at apex, minutely punctate. Wings hyaline, the subcostal vein and the stigma brown-black, the other veins testaceous ; the venation is as in the Bethyloid genus *Mesitius*, Spinola, and is also much as in *Cleptes*, Latr.; there are two indistinct discoidal cells represented by slight fuscous streaks.

Type.—Cat. No. 6343, U. S. N. M (Ashmead collection).

Hab.—Kansas, Lawrence. Taken by Mr. Hugo Kahl, July 7, 1896.

Mesitiopterus Townsendi, n. sp.

♂.—Length 2 mm. Head and thorax aeneous black, punctate ; scape of antennæ obclavate, aeneous black, the flagellum dull black ; tips of front and middle tibiæ and their tarsi, except at apex, testaceous, the hind tarsi fuscous, testaceous basally and beneath. Abdomen aeneous black, punctured very nearly as in *M. Kahl*i. Wings subhyaline, hyaline basally, the venation as in previous species.

Type.—Cat. No. 6344, U. S. N. M (Ashmead collection).

Hab.—Mexico, San Rafael, Jicoltepec (Prof. Tyler Townsend).

ON THE TYPE OF THE GENUS COCCUS, L.

BY MRS. C. H. FERNALD, AMHERST, MASS.

The first attempt to separate the species given under *Coccus* in the 10th edition of the *Systema Naturæ* of Linneus, was made by Geoffroy, in his *Histoire Abregée des Insectes*, Vol. I. (1762), where he placed a part of them under *Chermes* and left *adonidum* and *phalaridis*, with his new species *ulmi*, under *Coccus*. Of these species only *phalaridis* was given under the genus *Coccus* by Linneus in his 10th edition, and is therefore the only species that could be regarded as the type of *Coccus* so far as Geoffroy is concerned.

In 1802, Latreille, in Vol. III., p. 267, of his *Hist. Nat. Crust. Ins.*, established *hesperidum* as the type of the genus *Coccus*. I have not been able to find that any of the writers between the appearance of the work of Geoffroy and that of Latreille published anything that would fix the type of *Coccus*. Leach in 1815 and Samouelle in 1819 adopted *cacti* as the type, but the statement made by Leach that it "inhabits fruit trees" makes it quite certain that he had under consideration neither *cacti*, L., nor the cochineal insect. Samouelle merely copies Leach. Curtis, in his *British Entomology* (1838), gives *cacti*, L., as the type, but none of these three authors could affect the question, as the type had already been established by Latreille, if not by Geoffroy, as shown above.

The *phalaridis* of Linneus was so obscure an insect that the author himself could not determine whether it was a *Coccus*, an *Aphis* or a *Chermes*. Fonscolombe, in describing his *Coccus radicum graminis* (*Ann. Soc. Ent. Fr.* III., 212, 1834), gave the synonymy as follows: *Phalaridis* (?), Linn., Fab., non *C. phalaridis*, Enc. Meth. nec Geoffr. Prof. Cockerell has suggested the idea that the *phalaridis* of Geoffroy was possibly not the same species as the Linnean insect, which is precisely the same idea that Fonscolombe had, as shown by his synonymy. Since it is probably impossible to prove that Geoffroy had any of the Linnean species of the 10th edition in his restricted genus, the only safe ground will be to adopt the type established by Latreille in 1802, at least till further light is obtained on the identity of *phalaridis*, L., which at present is unknown.

If, therefore, we adopt *hesperidum* as the type of *Coccus*, the genera *Calymnatus* and *Calypticus* of Costa and *Lecanium* of Burmeister will fall

as synonyms of *Coccus*, and a new subfamily name will have to be substituted for *Lecaniinae* and also for the subfamily now called *Coccinae*.

The species *cacti*, L., as has been shown by Prof. Cockerell, is a *Monophlebus* and must be known by the name of *Monophlebus cacti*, L. This insect, so far as can be learned from the writings of those who are known to have had this species before them for study, does not possess colouring matter. When Fabricius and others simply copy the description of Linneus without changing it in any way we must consider it as pertaining to the Linnean species only, but when they add to that description the word "tinctorium," as Fabricius does in some of his later writings, we must conclude that he has confounded the cochineal insect with the Linnean species which has the following synonymy:

Coccus cacti, Linn., Syst. Nat., Ed. X., Vol. I., p. 457 (1758).

Coccus cacti, Linn., Syst. Nat., Ed. XII., Vol. I., p. 742 (1766).

Coccus cacti, Fab., Syst. Ent., p. 744 (1775).

Coccus cacti, DeGeer, Ins. Vol. 6, p. 447 (1776).

Coccus cacti, Fab., Spec. Ins., Vol. II., p. 395 (1781) in part.

Coccus cacti, Gmel., Syst. Nat., Ed. XIII., Vol. I., part IV., p. 2220 (1788-93) in part.

Coccus cacti, Fab., Ent. Syst., Vol. IV., p. 227 (1794) in part.

Coccus cacti, Fab., Syst. Rhyng., p. 311 (1803) in part.

Monophlebus cacti, Ckll., Science, n. ser., Vol. XV., p. 718 (1902).

The cochineal insect, so long confounded with *cacti*, L., was called by the specific name of *cacti* through a misapprehension, from the time of Fabricius till Costa, in his Fauna del Regno di Napoli, Emitteri, described the species under the name of *Dactylopius coccus*, in such a manner that there can be no doubt that he was dealing with the cochineal insect. In 1833 Brandt described it very fully, with excellent illustrations, under the name of *Coccus cacti*, and, while he supposed he had the Linnean species, his description and illustrations apply only to the cochineal insect. The synonymy of this insect is too extensive to be given here, but will appear in my Catalogue of the Coccidæ soon to be published.

The leading facts in this paper were prepared at my request by my husband, Prof. C. H. Fernald, in reply to questions from Prof. Cockerell, who requested him to publish the results of his investigations on the subject, but as Mr. Fernald does not wish to publish on the Coccidæ, he has turned the matter over to me to prepare for publication.

NOTES AND DESCRIPTIONS OF BEES.

BY J. C. CRAWFORD, JR., WEST POINT, NEBR.

The specimens on which this paper is based are in the collection of the University of Nebraska, unless otherwise stated. Especial acknowledgments are due to Prof. Cockerell for specimens and suggestions, to Prof. Titus for specimens, and to Prof. Bruner for overseeing my work.

Halictus montanus, n. sp.—Female: Black, head closely coarsely and deeply punctured on the vertex, coarser along the inner orbits, less closely on the face below the antennæ; clypeus sparsely and more coarsely punctured, fringed with golden hair at the apex; mandibles black, reddish at tips; antennæ black, flagellum dark brownish beneath towards tip; pubescence of head and thorax griseous, slightly tinged with ochraceous on the thorax, thin on the disc of mesothorax, dense on pleura and cheeks; thorax closely and rather coarsely punctured; base of metathorax enclosed and finely rugose, truncation finely roughened and with large punctures; tegulæ large, testaceous, and with punctures anteriorly; wings slightly yellowish, clouded apically; nervures and stigma bright testaceous; legs black, tarsi and hind tibiæ behind ferruginous; pubescence of legs slightly ochraceous, on inner side of tarsi and hind tibiæ golden; inner hind tibial spur with many short blunt teeth; abdomen black, very finely punctured, apical margins of segments with yellowish-white hair bands, bases of segments 2-4 also showing slight hair bands; pubescence at base of first segment griseous, on discs of other segments black, not showing plainly except from the sides. Length, 12-14 mm.

Male.—Similar to the female, but with the usual narrow form of the male. Most of mandibles and labrum and anterior half of clypeus yellowish-white, that on the clypeus produced to a tooth medially at rear; femora black, front and intermediate ones with a whitish stripe anteriorly, and all knees whitish; tibiæ yellowish white, with black stripes in front and behind; tarsi yellowish-white, apical joints tinged with reddish; antennæ long, reaching the metathorax, black, dull brownish beneath. In pubescence and punctuation like the female, the punctuation much closer, however. Length, about 12 mm.

Twelve female specimens: Big Horn Mts., Wyo.; Sioux Co., Nebr.; Logan, Utah; Laramie, Wyo.; Wawawai, Wash. (R. W. Doane, coll.); Wawawai, Yakima, and Almota, Wash. (C. V. Piper, coll.).

Ten male specimens: Wawawai, Wash (C. V. Piper, coll.); East Wash.

Halictus Titusi, n. sp.—♀. Black, head shining, vertex, clypeus and supraclypeal space with sparse and large punctures; sides of face with close, large, oblique punctures or depressions; mandibles black; antennæ dark, flagellum slightly brownish; head with sparse long pubescence, on cheeks and vertex slightly tinged with ochraceous; mesothorax with a bluish reflection, smooth with sparse large shallow punctures, scutellum with similar but smaller punctures; tegulæ large, shining, punctured, dark, with a lighter centre and broad testaceous margin; base of metathorax enclosed, closely, rather finely, longitudinally striate; wings hyaline, tinged with yellowish; nervures and stigma testaceous; thorax with long griseous hair slightly tinged with ochraceous; legs black, apical joints of tarsi ferruginous; pubescence of legs slightly ochraceous; of tarsi decidedly so; inner spur of hind tibiæ with many short blunt teeth; abdomen dull, smooth, with a very few shallow punctures, almost imperceptible; apical half of segments depressed; basal margins of segments 2–4 with a broad thin band of appressed white pubescence; last segment almost covered with this pubescence. Length, about 10 mm.

Type from San Diego, Calif.

Dedicated to Prof. Titus, from whom it was received.

This species is close to *H. trizonatus*, Cress., in general appearance, but is slightly more robust, the abdominal bands thinner and more griseous, the thorax less densely punctured, the abdomen with fewer punctures, etc.

Halictus fulgidus, n. sp.—♀. Black, shining, head very closely and coarsely punctured above the level of the antennæ, more sparsely so below; clypeus and supraclypeal space sparsely punctured, the former fringed with golden hairs; mandibles black, rufous towards tips; antennæ black, toward tip dark reddish brown; pubescence of head griseous and rather scanty; mesothorax finely tessellate, densely punctured along the edges, more sparsely so on the disc; pubescence long, thin and griseous, denser on pleura; metathorax shining black, coarsely rugose, truncation with a few coarse rugæ, but very finely striate all over; tegulæ shining black, externally testaceous; wings hyaline, nervures and stigma testaceous; legs black, apical joints of tarsi ferruginous, basal joints more or less so; pubescence of legs griseous, slightly tinged with

ochraceous, on the tarsi golden ; inner hind tibial spur with four long teeth, outer pectinate ; abdomen shining, very finely tessellate, first segment sparsely and finely punctured, the remaining segments densely punctured at base, becoming more sparsely so towards rear ; bases of segments 2-4 with bands of appressed white pubescence ; abdomen with sparse white pubescence, more conspicuous at sides and at apex, where it is slightly golden ; very narrow apical margin of segments testaceous ; venter dark dull reddish-brown. Length, about 9 mm.

Twenty-three specimens, Lincoln, Nebr., Apr., on willow, plum and apricot.

Halictus Cockerelli, n. sp. — ♀. Black, head closely and finely punctured ; large and sparse on the clypeus, which is fringed with golden hairs ; flagellum of antennæ ferruginous beneath, apical joints entirely so ; face and cheeks densely clothed with white appressed pubescence ; mandibles, except tips, ferruginous ; mesothorax rather closely and very finely punctured, the surface finely roughened ; median and parapsidal grooves plain ; metathorax with fine rugæ proceeding from the base, but not reaching the apex ; wings hyaline, splendidly iridescent ; nervures, stigma and tegulæ testaceous ; second submarginal cell greatly narrowed to marginal ; third not much narrowed ; legs brownish, knees, apices of tibiæ and tarsi entirely, testaceous ; pubescence of legs griseous, of tarsi golden ; inner hind tibial spur with about four or five short, blunt teeth ; abdomen shining, finely punctured and finely transversely striate, brownish, the apical margins broadly depressed and testaceous ; basal margins of segments 2-4 with bands of appressed white pubescence ; venter dull testaceous. Length, about 5-5½ mm.

Described from five specimens collected by Prof. Cockerell at Santa Fe and Mesilia, N. M., Apr. 22nd to July, on old flower clusters of Virginia Creeper and on flowers of yellow *Sisymbrium*.

Dedicated to Prof. Cockerell for his many kindnesses and aid in various ways.

Halictus pictus, n. sp. — ♀. Head and thorax brassy-green ; head very strongly and closely punctured on the vertex, below the antennæ the punctures large and coarse ; clypeus and supra-clypeal space sparsely punctured, the former purplish black at apex, fringed with golden hairs ; mandibles ferruginous, dusky at base and near apex at times ; sides of face with appressed white pubescence ; antennæ with scape and flagellum above black, flagellum beneath ferruginous ; mesothorax with strong

punctures sparser on the disc, closer at the edges, tessellate all over; scutellum with smaller and sparser punctures; pleura with long white pubescence; metathorax with a few fine rugæ on base, not reaching apex; tegulæ testaceous; nervures and stigma honey colour; femora dark brownish; tibiæ more or less, and tarsi entirely, ferruginous; their pubescence white tinged with golden, inner spur of hind tibiæ with two or three long teeth; abdomen ferruginous, shining, apical segments dusky at times; the first two segments naked on the disc, other segments covered with whitish pubescence; venter ferruginous. Length, $4\frac{1}{2}$ –6 mm.

Twenty-seven specimens: Sioux Co., and West Point, Holt Co., Nebr., on wild and cultivated Rose, and *Mentzelia*, June 10th to July 8th.

Differs from *H. Kunzei* in the mesothorax, not smooth centrally, the abdomen not black apically, and well clothed with pubescence, etc.

Halictus Bruneri, n. sp.—Head and thorax brassy green, pleura more olive green; head coarsely and closely punctured; clypeus with coarser and sparser punctures and black apically; mandibles ferruginous anteriorly; antennæ black; sides of face and cheeks with thin whitish pubescence; mesothorax anteriorly coarsely rugose, elsewhere very coarsely and rather closely punctured; pleura coarsely rugose; metathorax coarsely rugose, truncation with a salient rim and rugose; legs black, hind with ferruginous; all tarsi ferruginous and apices of tibiæ and knees ferruginous; wings hyaline, very slightly dusky, nervures and stigma dark testaceous; tegulæ dark brown, anteriorly punctured; abdomen black, shining, covered with appressed ochraceous pubescence, except discs of segments one and two.

Four ♀: West Point, Nebr., June 7–10, 1901, on rose and honeysuckle. Types in the author's collection.

Halictus rugosus, n. sp.—♀. Head and thorax greenish blue, thinly clothed with pale pubescence, slightly ochraceous on the vertex and dorsum of mesothorax, and longer on the cheeks and pleura; head behind the eyes finely roughened, in front coarsely and confluent punctured and also tessellate; less closely punctured below the antennæ; clypeus sparsely and very coarsely punctured, blackish anteriorly; supra-clypeal space finely punctured and tessellate; mandibles black, reddish medially; antennæ black, the flagellum dull brownish beneath apically; mesothorax finely roughened, the disc very coarsely and rather sparsely punctured, the sides and rear very coarsely reticulated, as is also the

scutellum ; pleura of mesothorax coarsely reticulated, of metathorax coarsely striated ; metathorax coarsely longitudinally striate, bordered apically by a rough irregular carina ; tegulæ dark, shining, with a light centre and a testaceous border ; wings slightly dusky, stigma and nervures brown ; legs black, the pubescence griseous, that on the inside of the tarsi golden, and more or less so on the outside ; outer hind tibial spur pectinate, the inner one with three teeth, the last one small ; abdomen black, polished, first segment impunctate, second finely punctured at base, that and the remaining segments finely transversely striate on the depressed apical margins ; segments two and three with slight basal lateral spots of pale pubescence ; all segments but first covered with sparse pubescence, more dense apically ; pubescence along the anal rima slightly ochraceous ; venter black, the segments tessellate, with large punctures, each bearing a hair ; margins of ventral segments testaceous. Length, 6 mm.

♂.—Similar to the female in colour and sculpture, but the face more brassy, the reticulations of the mesothorax finer and the punctures sparser ; head much broader than in the female and the clypeus cocked-hat shaped, with fine punctures ; mandibles long, slender, ferruginous except the black base ; antennæ long, testaceous beneath the flagellum ; cheeks produced to a spine beneath ; wings and nervures darker ; legs black, tarsi and base of hind tibiæ testaceous ; abdomen lacking the hair patches of the female. Length, 7 mm.

One female, two male specimens, Nebraska City, Nebr., Sept. 12th, 1901, on *Solidago*. (M. A. Carriker, Jr., coll.) Three females, Nebraska City, May 19th, 1901.

Although the male differs so markedly from the female in having the cheeks armed and in the different shape of the head (the inner orbits parallel), yet they are so like in other respects that they appear to be the same species.

Types in the collection of M. A. Carriker, Jr., and University of Nebraska.

Exomalopsis Bruneri, n. sp.—♀. Black, shining ; head sparsely punctured, vertex almost impunctate, clypeus with larger, sparse punctures and narrowly testaceous anteriorly ; mandibles black, reddish medially ; antennæ, the scape slightly reddish, flagellum ferruginous more or less dusky above ; pubescence of face whitish, on the vertex brownish ; sides of face with dense white decumbent pubescence, elsewhere the

pubescence of head sparse; mesothorax rather coarsely and sparsely punctured, rather densely clothed with brownish pubescence, longer and whitish on the pleura; on the disc posteriorly sparse; the scutellum bare, fringed posteriorly with brown hair; postscutellum similarly fringed posteriorly; the base of the metathorax with sparse punctures, the truncation smooth and polished; tegulæ brownish; nervures and stigma honey-colour; legs black, apical joints of tarsi ferruginous; legs clothed with brownish pubescence, that on the inner side of two anterior pairs of tarsi reddish; scopa of hind legs: on tibia whitish, tinged with yellow, on tarsus dusky reddish within; abdomen with the first two segments shining, smooth, apparently punctured only at the insertion of the hairs, which are sparse; the first segment truncate basally and the edge marked by a transverse carina; apical margins of segments with bands of brownish plumose pubescence, that on the first segment reduced to two lateral spots, slightly oblique; rest of segments in front of bands with dark pubescence; pubescence at the apex of abdomen more golden; ventral segments dark, apically ferruginous. Length, 7-8 mm.

♂.—Similar to the female, but with dense hair on the face and with the clypeus and labrum yellowish-white; pubescence lighter in colour; tarsi ferruginous. Length, 7-8 mm.

In old specimens the pubescence fades out and in the male becomes a silvery-white. Many specimens taken at Lincoln, Nebr., on *Helianthus annuus*.

Stelis pulchra, n. sp.—♀. Head greenish, bluish on the vertex, coarsely and confluent punctured on the face, on the vertex less closely and not confluent; thorax blue with greenish and purplish reflections, strongly but not closely punctured; abdomen greenish; pubescence on face light mixed with blackish and brownish hairs; on dorsum of thorax light; on pleura dark brown; on abdomen black; scape of antennæ greenish, punctured; flagellum dark testaceous, last three joints flattened on one side; tegulæ bluish with a light centre, punctured; legs same colour as the thorax, tarsi with dark brown hair; wings slightly dusky; abdomen with yellowish-white colour bands on segments 1-4; that on segment one bent backwards laterally; that on segment three attenuated laterally; that on segment four not reaching the sides of the abdomen and attenuated laterally; all narrowed medially; beneath bluish. Length, about 11 mm.

One specimen, Warbonnet Canyon, Sioux Co., Nebr., June 28th, 1901.

Epinomia triangulifera, Vachal.—Specimens of *E. persimilis*, Ckll., were sent to Mr. Vachal, and he writes that they are identical with his species. This name, having priority, must take the place of the one given by Prof. Cockerell.

Calliopsis verbenæ, var. *Nebraskensis*, n. var.—♀. Differs in having base of mandibles whitish and the apical margins of abdominal segments very pronouncedly testaceous; tegulæ entirely black and very polished.

♂.—Basal joints of tarsi blackish, apical ones testaceous; abdominal segments as in ♀.

This form was found at Lincoln, Nebr., July 4-7, and none of the typical form were taken.

NEW NORTH AMERICAN DIPTERA.

BY CHAS. W. JOHNSON, PHILADELPHIA, PA.

Macrocera immaculata, n. sp.—♂ ♀. Head yellow, vertex brownish; antennæ dark brown, the two basal joints yellow. Thorax dark yellow, with the anterior margin and humeri light yellow. Abdomen dark brown, shining, with a wide yellowish posterior margin on each segment. Legs yellow, slightly brownish at the tips of the femora, tibiæ and tarsi; legs and abdomen in the male with fine black hairs, which are less conspicuous in the female. Wings yellowish hyaline, with a slight brownish stigma and very fine hairs. Length of body 5 mm., the antennæ and posterior legs each about double the length of the body.

Two specimens collected at Richetts, North Mt., Pa., June 8, and one from the "Devil's Hole," Niagara Falls, N. Y., June 24. It resembles *M. hirsuta*, Loew, but is readily distinguished by its yellowish thorax and immaculate wings.

Phthiria Coquilletti, n. sp.—(*Phthiria*, n. sp. Smith's Coll. Insects of N. J., p. 649, 1899.) ♂. Face, front and occiput black, with a grayish pubescence; eyes purplish; proboscis and antennæ black, base of the

third and tip of the second joint narrowly banded with yellow. Thorax velvety black, with sparse, yellowish hairs; pleura grayish, scutellum black, the margin bearing a row of yellow hairs. Abdomen black, all excepting the first segment with a wide posterior marginal band of yellow, venter entirely yellow. Femora and coxæ black, tips of the femora and the tibiæ and tarsi yellowish, the outer portions of the tibiæ and tarsi more or less brownish, but usually absent on the middle tibiæ; basal half of the knobs of the halteres blackish, the remainder white. Wings hyaline. Length of body 3 mm., proboscis 1 mm.

♀.—Head light yellow or whitish; proboscis, the ocellary tubercle and third joint of the antennæ black, base of the third joint very narrowly marked with yellow, and the first and second joints yellowish or brownish. Thorax dull yellowish gray, the scutellum and pleura somewhat lighter, with a few whitish hairs. Abdomen a light yellowish colour, with sparse white hairs, the basal half of the second, third, fourth and fifth segments a dark brown or black; in drying, the abdomen often contracts so that only the brown of the second segment is visible. Legs yellow, the base of the front femora and the outer half of all the tarsi dark brown or black. Halteres white, the basal portion of the knobs tinged with brown.

Jamesbury and Riverton, N. J., July 3-6.

I first captured a male of this species at Jamesbury, July 4, 1891. It was submitted to Mr. Coquillett, who pronounced it new, but as the antennæ were wanting in the specimen he preferred not to describe it. Last summer, on July 3 and 4, I captured three females at Riverton. As they differed so much from the male, I was still unable to straighten out the matter, so postponed further study until another season. On July 4, at Riverton, while sweeping along a wood-road leading through a pine grove, I caught a male like the Jamesbury specimen, and on the 6th succeeded in capturing at the same place two males and seven females.

To my esteemed friend, Mr. D. W. Coquillett, I now take pleasure in dedicating this interesting species.

Psilocephala grandis, n. sp.—♀. Head black; face and lower part of the front with a white pubescence, on the front confined to the sides

and separated by two diverging lines of black, extending from the base of the antennæ, with an angular patch of brownish pubescence above; the remainder of the front somewhat opaque, with black hairs; occiput below with white pubescence and pile, above with grayish pubescence and black hairs; antennæ black (third joint wanting). Thorax black, with two lateral and two dorsal grayish stripes, the latter dividing the black into three equal areas; pleura covered with a white pubescence; scutellum black, with a whitish border, bearing four black bristles. Abdomen black, shining, the posterior angles of the first, second, third and fifth segments with large pollinose spots, having white hairs on all, excepting those on the fifth segment, which has the short black hairs common to the greater portion of the abdomen; on the first segment the white hairs are particularly prominent and extend over the entire lateral portion; venter opaque, black, with a white posterior band on the second, third and fourth segments, first, second and third segments whitish pollinose. Legs black, slightly yellowish at the knees and base of the tarsi, the coxæ with whitish pubescence; knobs of the halteres yellow. Wings hyaline, veins and stigma dark brown, bordered by a slight brownish tinge, base of the wing yellowish, tegulæ white. Length, $16\frac{1}{2}$ mm.

One specimen from Rouville Co., Province of Quebec, Canada; collected by Mr. G. Chagnon. The species is at once recognized by its large size. The specimen before me shows an interesting individual variation; on the right wing the fourth posterior cell is widely open, while on the left wing it is closed.

Agromysa flaviventris, n. sp.—Head light yellow, occiput black; antennæ yellow, aristæ black. Thorax light yellow, with a large black dorsal spot, which extends narrowly from the cervex, expanding dorsally, with lobes above the humeri and base of the wings; scutellum yellow, metathorax black. Abdomen dull light yellow, terminal segment black; halteres and legs yellow. Wings grayish hyaline. Length of the larger specimen, 2 mm.; the smaller one, $1\frac{1}{2}$ mm.

Niagara Falls, N. Y., June 23, 1901.

SYNOPSIS OF HALICTINÆ.

BY CHARLES ROBERTSON, CARLINVILLE, ILLINOIS.

In connection with the study of the pollination of flowers by insects, for several years and in several journals I have published notes on the local Halictinæ, with descriptions of new species and the missing sexes of some which were only known in one sex. This paper is intended to bring my results together in a brief form.

The so-called genus *Halictus* of authors seems to be altogether too heterogenous. I restore *Lasioglossum* and propose two other new genera. I think that the several genera must stand or fall together. The venation shows that *Agapostemon* and *Augochlora* are more closely related to *Halictus*, as here limited, than are *Lasioglossum*, *Evylæus* and *Chloralictus*.

As regards the dull greenish or bluish species, the venation shows that *H. fasciatus* belongs to *Halictus*, as here limited, a conclusion which is supported by the form of the pubescent fasciæ. The rest fall into *Chloralictus*, *Paralictus* and *Dialictus*.

Hemalictus, Ckll., holds the same relation to *Evylæus* that *Dialictus* holds to *Chloralictus*. It is significant that these two genera are developed from forms in which the vein III_5 is normally enfeebled.

Remarkably different from Andreninæ, this nervure is very constant in Halictinæ. I have found it wanting in one specimen of *Chloralictus versatus* and in one of *Evylæus cylindricus* received from Pérez, of Bordeaux. I have one specimen of *Oxystoglossa confusa* with the vein *rm* wanting in one wing, and another with veins *rm* and III_5 both wanting in one wing.

Oxystoglossa, Sm., has a definite type which, I judge from the description, belongs to the group having the hind spur finely serrate. The name is therefore used to designate that group.

In this paper vein *rm*=the radio-medial cross-vein=1st cubital nervure; vein III_5 =2nd cubital nervure; vein IV_3 =1st recurrent nervure; vein *a*=the cross-vein element of the arculus=the basal nervure; cell III_{1+2} =the marginal cell; cell III_5 =2nd submarginal cell; cell III_4 =3rd submarginal cell; "segment" refers to the abdomen; "joint" refers to the antenna.

Females.

Front wing with veins beyond IV_3 obsolescent; cells III_4 and III_5 subequal 5.

- Front wing with veins beyond IV_3 not obsolescent; cell III_4 at least nearly twice as long as III_5 1.
1. Labrum flat, ciliate; cell III_5 much wider than long, usually less than $\frac{1}{2}$ as long as III_4 ; cell III_{1+2} pointed on costa; vein IV_3 near end of cell III_5 ; metathorax usually strongly rugose; abdomen usually more or less red; hind spur finely pectinate; hind knee plate obsolete; rima on segment 5 obsolete. *Sphcodes*.
Labrum at apex produced, laterally compressed, pectinate; rima present 2.
 2. Black or dull greenish; segments of abdomen with apical pubescent fasciæ; cell III_{1+2} subappendiculate; vein IV_3 beyond the middle or near end of cell III_5 ; hind knee plate lanceolate; vein *a* rather suddenly bent at lower third *Halictus*.
Bright golden green, at least the head and thorax; segments of abdomen with pubescent fasciæ basal or wanting 3.
 3. Metathorax sharply truncate, the truncation circular, bordered by salient rim; hind spur with three broad spines; hind knee plate obsolete; cell III_{1+2} subappendiculate; vein IV_3 beyond middle of cell III_5 *Agapostemon*.
Metathorax rounded posteriorly, at least above, the truncation, when evident, subquadrate 4.
 4. Hind spur with 4-6 long teeth; cell III_{1+2} subappendiculate; vein IV_3 interstitial with III_5 , or entering cell III_4 ; vein *a* rather strongly bent about the middle; hind knee plate obsolete *Augochlora*.
Hind spur finely serrate; cell III_{1+2} usually pointed on costa; vein IV_3 usually interstitial with III_5 , rarely entering cell III_4 ; vein *a* regularly arcuate; hind knee plate present, lanceolate *Oxystoglossa*.
 5. Front wing with vein III_5 not obsolescent; cell III_{1+2} subappendiculate; vein IV_3 near end of cell III_5 ; hind spur finely serrate; insect unusually smooth and opaque; segments 2-4 with basal pubescent fasciæ *Lasioglossum*.
Front wing with vein III_5 also obsolescent or absent; vein IV_3 near end of cell III_5 or interstitial with vein III_5 6.
 6. Black *Epylacus*.
Dull greenish or bluish, at least the head and thorax; hind spur with 3-5 long teeth 7.

7. Vein III_5 wanting *Dialictus*.
 Vein III_5 present 8.
 8. Apex of labrum produced, laterally compressed, pectinate; mandibles
 dentate; cheek narrow *Chloralictus*.
 Apex of labrum broadly rounded, flat, ciliate; mandibles simple;
 cheeks and face broad; scopa, and rima of segment 5,
 obsolete *Paralictus*.

Males.

- Segments with apical pubescent fasciæ; black or dull
 greenish *Halictus*.
 Segments without apical pubescent fasciæ 1.
 1. Head and thorax dull greenish or bluish 6.
 Head and thorax bright golden green 4.
 Head and thorax black 2.
 2. Clypeus black, rather densely whitish pubescent; cell III_5 usually
 about $\frac{1}{2}$ as long as III_4 ; abdomen often more or less
 red *Sphecodes*.
 Clypeus anteriorly with a yellowish mark, or black and thinly
 pubescent 3.
 3. Joint 4 a little shorter than 2 + 3; cheek broad; metathorax rather
 smooth; segments 2-4 with basal pubescent fasciæ. *Lasioglossum*.
 Joint 4 longer than 2 + 3, or only a little longer than 3; those with
 basal pubescent fasciæ always have the metathorax strongly
 rugose *Evylæus*.
 4. Abdomen black, with yellow bands *Agapostemon*.
 Abdomen like the head and thorax 5.
 5. Ventral segments 1-3 rigid, bright green, the others dark, retracted;
 tibiæ green; tarsi pale *Augochlora*.
 Ventral segments dark, except sometimes the middle ones, not rigid
 or retracted; tibiæ pale at least at base and apex... *Oxystoglossa*.
 6. Joint 4 hardly longer than 3; vein III_5 absent *Dialictus*.
 Joint 4 = 2 + 3, or nearly; vein III_5 present 7.
 7. Clypeus convex *Chloralictus*.
 Clypeus flat *Paralictus*

• HALICTUS, Latr.

Females.

- Dull greenish; hind spur with 4 or 5 teeth *fasciatus*.
 Black, sometimes inclining to ferruginous 1.

1. Wings and legs ferruginous ; hind spur finely serrate, with 12 or more teeth.....*parallelus*.
Wings and legs not ferruginous ; hind spur with about 6-8 teeth...2.
2. Cheek beneath produced into a strong tooth or dentiform angle.....*ligatus*.
Cheek rounded.....*Lerouxii*.

Males.

- Dull greenish ; legs yellow.....*fasciatus*.
Black.....1.
1. Femora and wings yellow or ferruginous.....*parallelus*.
Femora black.....2.
 2. Flagellum black ; mandibles usually black.....*Lerouxii*.
Flagellum beneath and middle of mandibles yellow.....*ligatus*.

AGAPOSTEMON, Guérin.

Females.

- Abdomen black.....*viridulus*.
Abdomen green.....1.
1. Mesonotum with a distinct double punctuation.....*Texanus*.
Mesonotum without a distinct double punctuation.....2.
 2. Metathorax strongly longitudinally rugose, without enclosure.....*radiatus*.
Metathorax coarsely reticulated, a triangular space finely rugose.....*splendens*.

Males.

- Abdomen with six yellow bands.....2.
Abdomen with five yellow bands.....1.
1. Ventral segment 4 thin, entire, 6 with a median carina....*viridulus*.
Ventral segment 4 thickened, emarginate, margin depressed between the gibbous sides.....*Texanus*.
 2. Hind femora robust, their metatarsi carinate ; basal middle of abdomen ferruginous.....*splendens*.
Hind femora less robust, their metatarsi simple ; basal middle of abdomen black, with a greenish tinge.....*radiatus*.

AUGOCHLORA, Sm

- Segment 2 rather opaque, closely punctured, densely ciliate..*fervida*.
Segment 2 shining, sparsely punctured, hardly ciliate.....*viridula*.

OXYSTOGMOSSA, Sm.

Females.

- Sides of mesonotum not reticulated ; cell III₁₊₂ subappenediculate.....*pura*.

Sides of mesonotum reticulated; cell III₁₊₂ pointed on costa 1.

1. Larger, greener; antennæ, tegulæ and legs darker *confusa*.
Smaller, more brassy; antennæ, tegulæ and legs paler *similis*.

Males.

Ventral segment 4 not emarginate, greenish *pura*.

Ventral segment 4 emarginate, not greenish 1.

1. Larger, greener; antennæ, tegulæ and legs darker *confusa*.
Smaller, more brassy; antennæ, tegulæ and legs paler *similis*.

LASIOGLOSSUM, Curtis (Type *Melitta xanthopus*, Kby.).

Females.

Metathorax sharply truncate, the posterior face with sharp edge *fuscipenne*.

Metathorax rounded posteriorly, no distinct posterior face 1.

1. Clypeus less produced; mesonotum more shining; metathorax more rugose, more shining, the edge more salient *Forbesii*.

Clypeus produced; mesonotum and metathorax smooth and opaque *coriaceum*.

Males.

Face subquadrate; apex of one mandible reaching base of the other; tarsi dark *coriaceum*.

Face narrowed below; apex of one mandible reaching the middle of the other; tarsi whitish *Forbesii*.

EVYLAEUS, gn. nov. (Type *Halictus arcuatus*, Rob.).

Females.

Abdomen with pubescent fasciæ interrupted or wanting 2.

Abdomen with pubescent fasciæ continuous; metathorax coarsely rugose 1.

1. Metathorax sharply truncate; hind spur with long distinct teeth; segment 1 impunctate *truncatus*.

Metathorax a little rounded behind; hind spur with teeth shorter, more oblique, less distinct; segment 1 finely punctured . . *arcuatus*.

2. Hind spur pectinate, with numerous fine, rather long, teeth *pectinatus*.

Hind spur with 4 or 5 distinct teeth 3.

3. Metathorax without an enclosed space 5.

Metathorax with an enclosed space 4.

4. Enclosure subtriangular; metathorax elsewhere densely pubescent *nelumbonis*.

Enclosure semicircular; metathorax bare or nearly so . . . *pectoralis*.

5. Segments 2-4 with white pubescent patches on each side *quadrinaculatus*.
 Segments 2-4 without white pubescent patches..... *Foxii*.

Males.

- Antennæ long, joint 4 longer than 2 + 3 3.
 Antennæ short, joint 4 hardly longer than 3 1.
 1. Clypeus anteriorly, mandibles, knees and tarsi, whitish *quadrinaculatus*.
 Clypeus anteriorly and the legs dark 2.
 2. Enclosure of metathorax semicircular..... *pectoralis*.
 Enclosure triangular..... *nelumbonis*.
 3. Metathorax finely rugose, apex gibbous, shining; small..... *Foxii*.
 Metathorax coarsely rugose; scutellum subbilobed; flagellum festooned; tarsi whitish; larger..... 4.
 4. Segment 1 finely, distinctly, sparsely, punctured; apical margins of segments narrowly pale testaceous..... *arcuatus*.
 Segment 1 almost impunctate; insect more slender, blacker, knees more whitish..... *truncatus*.

CHLORALICTUS, gn. nov. (Type *Halictus Cressonii*, Rob.).

Females.

- Tegulæ not punctate 2.
 Tegulæ punctate 1.
 1. Metathorax sharply truncate, with a sharp edge; wing whitish *nymphæarum*.
 Metathorax hardly truncate, the edge blunt..... *tegularis*.
 2. Abdomen not metallic 6.
 Abdomen greenish or bluish..... 3.
 3. Mesonotum shining, sparsely punctured; abdomen thinly pubescent; head hardly longer than broad; cheek broad and rounded..... 5.
 Mesonotum opaque, finely rugose, closely punctured; abdomen densely pubescent; head distinctly longer than broad; cheek narrow..... 4.
 4. Wing and pubescence yellowish; mesonotum brassy..... *pilosus*.
 Wing and pubescence whitish; mesonotum pale greenish.. *pruinatus*.
 5. Dark blue..... *caeruleus*.
 Brassy green *sephyrus*.
 6. Mesonotum rather finely punctured..... 8.
 Mesonotum rather coarsely punctured 7.

7. Wing and nervures whitish *albipennis*.
 Wing and nervures ordinary *Cressonii*.
8. Head distinctly longer than broad ; cheek narrow ; mesonotum quite opaque with fine roughness, sparsely punctured, often a little brassy *cereopsis*, sp. nov.
 Head hardly longer than broad ; cheek broad 9.
9. Abdomen yellowish testaceous *testaceus*.
 Abdomen darker 10.
10. Abdomen obovate ; segments 1-2 shining ; 3-5 darker, more opaque, with sparse closely-appressed hairs ; mesonotum shining, sparsely, finely, punctured ; metathorax nearly smooth *sparsus*, sp. nov.
 Abdomen more oval, more densely pubescent, the hairs less appressed 11.
11. Disc of metathorax bordered by a raised line, especially laterally *Illinoensis*.
 Disc of metathorax not bordered by a raised line 12.
12. Abdomen brown, segments 3-5 closely pubescent .. *versatus*, sp. nov.
 Abdomen more black, segments 3-5 less pubescent 13.
13. Raised lines of disc of metathorax not reaching the apex, the latter rounded *obscurus*.
 Raised lines of metathorax reaching apex, which is truncate *smilacine*.

Males.

- Tegulae not punctate 2.
 Tegulae punctate 1.
1. Metathorax with semicircular enclosure ; wing whitish. *nymphaearum*.
 Metathorax without enclosure ; wing ordinary *tegularis*.
2. Abdomen without greenish or bluish reflection 7.
 Abdomen greenish or bluish. 3.
3. Mesonotum smooth and shining, finely and sparsely punctured ; head hardly longer than wide 6.
 Mesonotum finely rugose, opaque, closely punctured 4.
4. Head a little longer than wide ; clypeus without yellowish ; the greenish tinge of abdomen slight *versatus*, sp. nov.
 Head much longer than wide ; apex of clypeus usually yellowish ; abdomen distinctly greenish 5.
5. Pubescence above and nervures and stigma yellowish *pilosus*.

- Pubescence above and nervures and stigma whitish *pruinus*.
6. Dark blue.....*cæruleus*.
Greenish ; abdomen usually more or less testaceous.....*zephyrus*.
7. Abdomen and tibiæ almost entirely testaceous*zephyrus*.
Abdomen not testaceous ; tibiæ black except often at base and apex.....8.
8. Sides of metathorax and pleura distinctly punctured, the latter beneath with a distinct fovea ; mesonotum smooth, shining, coarsely punctured *foveolatus*, sp. nov.
Sides of metathorax and pleura not distinctly punctured.....9.
9. Vein III₅ and beyond almost obsolete ; head much longer than wide ; mesonotum finely rugose, opaque, sparsely, finely punctured ; antennæ short ; tarsi pale..... *coreopsis*, sp. nov.
Vein III₅ and beyond ordinary ; head not, or hardly, longer than wide..... 10.
10. Mesonotum finely punctured 12.
Mesonotum coarsely punctured, shining 11.
11. Wing white, nervures and stigma white *albipennis*.
Wing ordinary, nervures and stigma dark ; metathorax coarsely reticulated, with a semicircular enclosure bordered by a sharp edge *Cressonii*.
12. Mesonotum shining ; head wider than thorax ; metathorax at apex gibbous, smooth, shining ; nervures and stigma dark ; abdomen subclavate, almost impunctate, usually darker towards apex ; length 4 mm..... *sparsus*, sp. nov.
Mesonotum opaque ; abdomen hardly subclavate 13.
13. Abdomen bronze black, minutely punctured, bare impunctate apical margins of segments broad ; nervures and stigma dark .. *obscurus*.
Abdomen less black, distinctly punctured, bare impunctate apical margins of segments narrow, often pale testaceous ; nervures and stigma pale : length, 4-6 mm *versatus*, sp. nov.

PARALICTUS, Rob.

Females.

- Cheek regularly rounded ; face narrowed below.....*simplex*.
Cheek with rounded angle below middle of eye ; face narrowed below.....*platyparius*.
Cheek with rounded angle a little above middle of eye ; face not narrowed below.....*cephalicus*.

ANNUAL MEETING AT LONDON ON OCTOBER 29th AND 30th.

The
Canadian Entomologist

VOLUME XXXIV.

No. 10.

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EDITED BY

REV. C. J. S. BETHUNE,

LONDON, ONTARIO.

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EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

LEPIDOPTERA.—I desire to exchange with collectors in all parts of N. A., particularly N.-W. and S.-W. JOHN L. HEALY, 1137 Pratt Ave., Chicago, Illinois.

LEPIDOPTERA.—Would like Parnassius of the world, except Apollo and Sminthens. Also good N. American Lepidoptera. Have to offer: Chion. Brucei and oeno, Erebia magdalina and callias, Colias Scudderi, melitæa, Brucei, minuta and anicia, Lycæna shasta, Pamphila Snowi, and others. JOHN & HURD COMSTOCK, 1572 Ridge Ave., Evanston, Illinois.

LEPIDOPTERA.—Western and northern Argynnis especially desired, but will exchange for anything new to collection or for perfect specimens of less rare material. I offer Chionobas oeno, Brucei, Uhleri and Chryxus; Colias Meadii, Scudderi and Alexandra; Melitæa Brucei, minuta, etc. Also many Argynnis and local species of Catocalæ. ARTHUR J. SNYDER, Belvidere, Illinois, U. S. A.

LEPIDOPTERA.—I would like to correspond and exchange with some new beginners. PHINIUS WHITING, 106 Fairmount St., Lowell, Mass., U. S. A.

LEPIDOPTERA.—Superb examples of *Hemileuca tricolor*, *Catocala chelidonia* and *habayaga*, *Pam. python*, *Apatura leilia* and other extreme rarities in exchange for species of equal interest. O. C. POLING, Quincy, Ill.

LEPIDOPTERA.—Eggs and imagoes of Catocalæ and Sphingidæ of the world wanted. Choice Southern and Western butterflies in exchange. Address: EDWIN LANSING, JR., Salem, Ore., U. S. A.

I WILL make collections of Lepidoptera in the Mississippi Valley in exchange for specimens of other localities. Address: G. H. ROSS, Burlington, Iowa.

WILL COLLECT insects of all orders from this locality for entomological publications not in my library. REV. J. W. STACEY, Clarksville, Mich.

WANTED.—Psyche, Vol. IV., parts 138 to 140, and Index; Vol. V., parts 145 to 148. Will exchange any parts of Vols. 1, 2 and 3 for these. R. F. PEARSALL, 1334 Dean St., Brooklyn, N. Y.

BRACHYNINI.—Specimens from all parts of the world wanted. GERMAIN BEAULIEU, P. O. Box 2168, Montreal, Canada.

ARGYNNIDS WANTED.—Arg. *atlantis*, *electa*, *leto*, *cypris* and *aphrodite*. Have numerous duplicates for exchange, chiefly amongst Noctuidæ. F. H. WOLLEY DOD, Box 225, Calgary, Alberta.

WANTED.—Lepidoptera from Canada and U. S. A., in papers, correctly named, in exchange for Lepidoptera of the world, correctly named. W. NEUBURGER, Halensee-Berlin, Lutzenstrasse 10, Germany.

WANTED.—Fresh specimens of all the species of *Andrena* to be met with in various localities in North America north of Mexico; this for the purpose of working over the genus. Address: L. BRUNER, care University of Nebraska, Lincoln, Neb.

PLUSIAS WANTED.—Having just described some new Plusias, all from females, I wish to obtain males of these and specimens of others in which my series is short. Very liberal returns. DR. R. OTTOLENGUI, 80 West 40th Street, New York.

EUROPEAN COLEOPTERA.—I have a large quantity of European Coleoptera which I wish to exchange for American. Lists furnished. PAUL J. ROELOFS, 90 Rue van Straelen, Antwerp, Belgium.

TENTHREDINOIDEA.—Sawflies from all parts of Canada desired for study, with view to publication of catalogue. Material will be returned or exchanges made. W. HAGUE HARRINGTON, P. O. Dept., Ottawa.

WILL COLLECT any order this season in Pennsylvania and New Jersey, in exchange for Hymenoptera—unmounted. Wanted just as it comes from the field—especially Siricoidea, Tenthredinoidea, Ichneumonoidea, and Evanioidea. J. CHESTER BRADLEY, 2221 Spring Garden St., Philadelphia, Pa.

WILL COLLECT in any order in exchange for Coleoptera and Lepidoptera (Noctuina specially). CHARLES STEVENSON, 906 St. Urbain Street, Montreal, Que., Canada.

N. A. LEPIDOPTERA desired. Those willing to collect, in exchange for European specimens, please communicate with JAMES MCDUNNOUGH, Kleist Str. 42, Berlin, Germany.

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No. 10

A PRELIMINARY LIST OF ACRIDIIDÆ OF ONTARIO.

BY E. M. WALKER, B. A., TORONTO.

Since the last of my "Notes on Some Ontario Acridiidae" were printed, five species have been added to the list, and the number of localities for those already recorded has been considerably increased. I think, therefore, that it will make the notes more complete to conclude them with a full list of the species of this family known to occur in the Province, with their distribution as hitherto recorded.

Only a small portion of the territory included in the Province of Ontario has been at all thoroughly explored by entomologists, but I do not believe there are very many native species of Acridiidae not included in the present list. Doubtless, however, some of the Manitoba and Minnesota forms extend into the north-western part of Ontario, while it is extremely probable that there are unrecorded species in the south-west, and possibly a few in the east and extreme north.

The five species referred to above are as follows :

TRYXALIS BREVICORNIS, Linn.

Gryllus brevicornis, Linn. Syst. Nat., ed. 12, II., 692 (1767).

Tryxalis brevicornis, Fabr. Syst. Ent., 279 (1775).

Pyrgomorpha brevicornis, Walk. Cat. Derm. Salt. Brit. Mus., III., 500 (1870).

Opsomala punctipennis, Serv. Orth., 590 (1839).

Two males of this southern species were taken just above Point Pelee, in an open marsh bordering a creek, on Aug. 8, 1901. They were very active, and leaped several times among the sedge before they were caught.

This species has a very interesting distribution, being found from Long Id. and Indiana south to the Gulf of Mexico, and through Texas to Honduras and Brazil.

ORPHULELLA PELIDNA, Burm.

Gomphocerus pelidnus, Burm. Handb. Ent., II., 650 (1838).

Stenobothrus maculipennis, Scudd. Bost. Jour. Nat. Hist., VII., 458-459 (1862).

Stenobothrus propinquans, Scudd. Ibid., VII., 461 (1862).

Orphula pelidna, McNeill. Proc. Dav. Acad. Nat. Sc., VI., 235-239 (1897).

Orphulella pelidna, Scudd. CAN. ENT., XXXI., 179-187 (1899).

I found this species in large numbers in a tract of open marsh land bordering the St. Clair River, just north of Sarnia. This piece of land was dry when I visited it, but in the early summer was covered with water. *O. pelidna* was found in the more bare places, where the ground was dry and somewhat cracked. The males produced a rapid, rattling sound when flying, like the various members of the Oedipodinae, but the sound did not last more than about a second. Although the grass was long where they occurred, they always alighted on the ground.

TRIMEROTROPIS HURONIANA, Walk.

Trimerotropis huroniana, Walk. CAN. ENT., XXXIV., 1 (1902).

This species has been fully described under the above reference, so that it need only be alluded to here.

PAROXYA FLORIDANA, Thom.

Caloptenus floridanus, Thom. Bull. U. S. Geol. Surv. Terr., I., No. 2, 68 (1874).

Paroxya atlantica, Scudd. (pars). Proc. Bost. Soc. Nat. Hist., XIX., 29, 88 (1887).

Paroxya floridana, Smith. Cat. Ins., N. J., 412 (1890).

This insect was found in considerable numbers in a sedge swamp bordering a small stream at Arner, Ont. It is a southern form.

MELANOPLUS BRUNERI, Scudd.

Melanoplus Bruneri, Scudd. Rev. Mel. 164, 1897.

On Sept. 2, 1902, while collecting at Dwight, in Northern Muskoka, at the close of a fortnight's canoe trip in Algonquin Park, I captured a single specimen of a *Melanoplus*, which I at once recognized as new to Ontario. There was not time to make a thorough search for more specimens, and none were found. The specimen is a male and agrees in nearly all respects with *M. Bruneri* as described in Scudder's Revision. The chief point in the description which does not fit my specimen is the statement that the interspace between the mesosternal lobes is more than twice as long as broad in the male, whereas in my specimen it is slightly less than twice as long as broad. The male cerci appear more upcurved

than is represented in Scudder's figure, which it otherwise resembles pretty closely.

M. Bruneri is a western species, having been reported from Alberta, Washington, Idaho, Montana, Colorado and Nebraska.

In the list I have used the abbreviations Caulf. and Walk. in reference to the following two articles, respectively:

Caulfield, F. B.: A sketch of Canadian Orthoptera. Rep. Ent. Soc., Ont., XVIII., 59-72 (1888).

Walker, E. M.: Notes on some Ontario Acridiidae, CAN. ENT., XXX., 122-126 (1898); Ibid., XXX., 258-263 (1898); Ibid., XXXI., 29-36 (1899).

The names of new localities are given in italics.

I.—TETTIGINÆ.

1. *Nomotettix cristatus*, Scudd. Toronto (Caulf.).
2. *Tettix granulatus*, Kirby. Ottawa, Ont., generally, to L. Superior (Caulf.); Toronto, L. Simcoe, Muskoka (Walk.); *Six-mile Lake*, Aug. 24, 1898; *Sarnia*, Aug. 12, 1901; *Southampton*, Aug. 20, 1901; *Johnson's Harbour*, Bruce Co., Aug. 22, 1901; *Stokes Bay*, Bruce Co., Aug. 27, 1901; *Tobermory*, Aug. 24, 1901; *Owen Sound*, Aug. 31, 1901; *North River* and *Island Lake*, *Algonquin Park*, Aug. 24, 28, 1902.
3. *Tettix acadicus*, Scudd. Lake of the Woods (Scudd., Daws., Rep. Geol., 49 par., 345, 1875).
4. *Tettix ornatus*, Say. Ont. generally (Caulf.); Toronto (Walk.); *Sarnia*, Aug. 16, 1901.
- 4a. *Tettix ornatus*, var. *triangularis*, Scudd. Ottawa, Ont., generally (Caulf.); Toronto (Walk.); *Southampton*, Aug. 29, 1901; *North River*, *Algonquin Park*, Aug. 20, 1902.
5. *Tettix Hancocki*, Morse. } Sudbury (Morse, Journ.
- 5a. *Tettix Hancocki*, var. *abbreviatus*, Morse. } N. Y. Ent. Soc., VII., 200-201, 1889; Toronto, May, Sept., Oct.; *Lake Simcoe*, Aug., Sept.; *Little Eagle Harbour*, Bruce County, Aug. 23, 1901; *Dwight*, *Muskoka*, Sept. 2, 1902.
6. *Tettix obscurus*, Hanc. De Grassi Pt. (Hancock, Tet. N. A., 89, 1902); Toronto, April; *Goderich*, Aug. 19, 1901; *Owen Sound*, Aug. 31, 1901.
7. *Tettix gibbosus*, Hanc. Toronto (Hanc., Tet. N. A., 90, 1902); *Lake Simcoe*, July 5, 1901. NOTE.—Species 5, 6 and 7 were included in *T. ornatus* in my "Notes on some Ontario Acridiidae."

8. *Paratettix cucullatus*, Scudd. Ont. generally (Caulf.); Toronto (Caulf., Walk.); *Chatham*, Aug. 10, 1901. NOTE.—*P. rugosus*, Scudd., is reported by Caulfield from Sudbury, but probably incorrectly, as it is a southern species.
9. *Tettigidea parvipennis*, Harris. Ottawa, Ont., generally, to L. Superior (Caulf., *polymorpha*); Ont. (Walk.); *Pt. Pelee*, Aug. 7, 1901 (nymphs); *Arner*, Aug. 8, 1901 (nymphs); *Owen Sound*, Aug. 31, 1901; *North River, Algonquin Park*, Aug., 1902 (nymphs); *North Bay*, Sept. 12, 1900.
- 9a. *Tettigidea parvipennis*, var. *pennata*, Morse. Ottawa, Ont., generally, to L. Superior (Caulf., *lateralis*); Toronto, L. Simcoe, (Walk.).

II.—TRYXALINÆ.

10. *Tryxalis brevicornis*, Linn. *Pt. Pelee*, Aug. 8, 1901.
11. *Orphulella pelidna*, Burm. *Sarnia*, Aug. 12, 13, 15, 1901.
12. *Orphulella speciosa*, Scudd. Toronto, Lake Simcoe (Walk.); *Rond Eau*, Sept. 15, 1899; *Arner*, Aug. 9, 1901; *Sarnia*, Aug. 12, 16, 1901. (The *Orphula aequalis* of my former paper.)
13. *Chlœaltis conspersa*, Harris. Rat Portage (Caulf.); Nepigon (Caulf., Walk.); Toronto, Lake Simcoe, Clear Lake, Kingsville, Severn River (Walk.); *Rond Eau*, Sept. 15, 1899; *Pt. Pelee*, Aug. 7, 1901; *Arner*, Aug. 9, 1901; *Sarnia*, Aug. 12, 1901; *Goderich*, Aug. 18, 1901; *North River, Algonquin Park*, Aug., 1902; *North Bay*, Sept. 12, 1900.
- 13a. *Chlœaltis conspersa*, var. *prima*, Morse. Lake Simcoe (Walk.).
14. *Chlœaltis abdominalis*, Brun. Severn River (Walk.)
15. *Stenobothrus curtippennis*, Harris. Ottawa, Ont., generally, to the north of L. Superior (Caulf.); Ont. (Walk.); *Toronto*; *Lake Simcoe*; *Clear Lake*, July 27, 1897; *Niagara*, Sept. 26, 1898; *Rond Eau*, Sept. 14, 1899; *Pt. Pelee*, Aug. 7, 1901; *Arner*, Aug. 9, 1901; *Chatham*, Aug. 10, 1901; *Sarnia*, Aug. 12, 16, 1901; *Walpole Id., River St. Clair*, Aug. 13, 1901; *Goderich*, Aug. 18, 1901; *Southampton*, Aug. 20, 29; *Johnson's and Little Eagle Harbours, Bruce Co.*, Aug. 22, 23, 1901; *Tobermory*, Aug. 24, 1901; *Owen Sound*, Aug. 30, 31, 1901; *Severn River*, Aug. 17, 1878; *Lake Muskoka*, Aug. 27, 1899; *Algonquin Park*, Aug., 1902; *North Bay*, Sept. 12, 1900.
- 15a. *Stenobothrus curtippennis*, var. *longipennis*, Scudd. Same localities as preceding.

16. *Mecostethus lineatus*, Scudd. Toronto, Lake Simcoe, Aurora, (Walk.); *Point Pelee*, Aug. 8, 1901; *Sarnia*, Aug. 12, 16, 1901; *Stokes Bay, Bruce Co.*, Aug. 27, 1901.
17. *Mecostethus gracilis*, Scudd. Lake Simcoe, Aurora (Walk.). In my "Notes" I stated that this species had precisely similar haunts to those of the preceding. Further collecting has shown that although often found together, *gracilis* prefers comparatively small open places in swampy woods, whereas *lineatus* occurs in large, open, sedgy marshes.

III.—OEDIPODINÆ.

18. *Arphia tenebrosa*, Scudd. Nepigon, Sudbury (Caulf.).
19. *Arphia sulphurea*, Fab. Ont., generally (Caulf.); Toronto (Caulf., Walk.); *Sarnia*, Aug. 16, 1901 (larva).
20. *Chortophaga viridifasciata*, De Geer. Ottawa, Ont., generally, to north of L. Superior (Caulf.); Hamilton, Grimsby, Toronto, Lake Simcoe, Clear Lake (Walk.); *Rond Eau*, Sept. 15, 1899 (nymphs); *Arner*, Aug. 9, 1901 (nymph); *Walpole Id.*, Aug. 13, 1901 (nymphs); *Goderich*, Aug. 19, 1901 (nymph).
- 20a. *Chortophaga viridifasciata*, form *infuscata*, Harris. Same localities as preceding.
21. *Encoptolophus sordidus*, Burm. Toronto, Hamilton, Niagara, Lake Simcoe (Walk.); *Rond Eau*, Sept. 14, 1899; *Arner*, Aug. 9, 1901 (nymphs); *Sarnia*, Aug. 16, 1901; *Goderich*, Aug. 19, 1901 (nymphs); *Southampton*, Aug. 20, 1901 (nymph).
22. *Camnula pellucida*, Scudd. Nepigon, Clear Lake, Lake Simcoe, Toronto (Walk.); *Rond Eau*, Sept. 14, 1899; *Point Pelee*, Aug. 7, 1901; *Sarnia*, Aug. 12, 1901; *Walpole Id.*, Aug. 13, 1901; *Goderich*, Aug. 19, 1901; *Southampton*, Aug. 20, 1901; *Johnson's and Little Eagle Harbours, Bruce Co.*, Aug. 22 and 23, 1901; *Tobermory*, Aug. 24, 1901; *Stokes Bay*, Aug. 27, 1901; *Owen Sound*, Aug. 30, 1901; *Severn River*, Aug. 15, 17, 1898; *Lake Muskoka*, Aug. 27, 1899; *North River, Algonquin Park*, Aug., 1902; *North Bay*, Sept. 12, 1900.
23. *Hippiscus tuberculatus*, Pal. de Beauv. Nepigon (Caulf., Scudd., Psyche, VI., 304, 1892); Ottawa (Harrington, Ann. Rep. Ent. Soc., Ont, 1883, 17); Toronto, London (Walk.); *Sault Ste. Marie*, June 7, 10, 1889.
24. *Dissosteira carolina*, Linn. Ont., generally, to Lake Superior (Caulf.); Rat Portage, Muskoka, Lake Simcoe, Toronto, Hamilton (Walk.);

- Rond Eau*, Sept. 14, 1899; *Pt. Pelee*, Aug. 7, 1901; *Arner*, Aug. 9, 1901; *Chatham*, Aug. 10, 1901; *Sarnia*, Aug. 12, 1901; *Walpole Id.*, Aug. 13, 1901; *Southampton*, Aug. 20, 1901; *Goderich*, Aug. 19, 1901; *Tobermory*, Aug. 24, 1901; *Owen Sound*, Aug. 30, 1901; *Severn River*, Aug., 1898; *North River*, *Algonquin Park*, Aug., 1902; *North Bay*, Sept. 12, 1900.
25. *Spharagemon collare*, Scudd., race *Wyomingianum*, Morse; *Rond Eau* (Walk.); *Pt. Pelee*, Aug. 7, 1901. (The specimens from *Pt. Pelee* average distinctly larger than those from *Rond Eau*.)
26. *Spharagemon bolli*, Scudd. *Toronto* (Morse, *Psyche*, VI., 291, Walk.); *Stony Lake*, *Peterboro Co.* (Walk.); *Rond Eau*, Sept. 15, 1899; *Pt. Pelee*, Aug. 7, 1901; *Arner*, Aug. 9, 1901; *Sarnia*, Aug. 16, 1901. (The specimens from *Rond Eau*, *Pt. Pelee* and *Arner* are much larger than those from the other more northern localities.)
27. *Scirtetica marmorata*, Harris. *Sparrow Lake*, *Gravenhurst*, *Severn River* (Walk.); *Lake Muskoka*, Aug. 27, 1899.
28. *Trimerotropis maritima*, Harris. *Toronto Id.*, *Kingsville* (Walk.); *Rond Eau*, Sept. 14, 1899; *Pt. Pelee*, Aug. 7, 1901; *Walpole Id.*, Aug. 13, 1901; *Sarnia*, Aug. 12, 14, 1901.
29. *Trimerotropis huroniana*, Walk. *Southampton* (Walk., *CAN. ENT.*, XXXIV., 1).
30. *Circotettix verruculatus*, Kirby. *Ottawa* (Caulf.); *Rat Portage*, *Molson*, *Jackfish*, *Stony Lake*, *Lake Simcoe*, *Aurora*, *Gravenhurst* (Walk.); *Southampton*, Aug. 21, 29, 1901; *Johnson's and Little Eagle Harbours*, *Bruce Co.*, Aug. 22, 23, 1901; *Tobermory*, Aug. 24, 1901; *Stokes Bay* and *Burke Id.*, *Lake Huron*, Aug. 27, 1901; *Owen Sound*, Aug. 31, 1901; *Severn River*, Aug. 14, 1898; *Lake Muskoka*, Aug. 27, 1899; *North River*, *Algonquin Park*, Aug., 1902; *North Bay*, Sept. 12, 1900.

ACRIDINÆ.

31. *Schistocerca Americana*, Drury. *London* (Moffat); *Toronto* (Walk.).
32. *Podisma glacialis*, Scudd. *Sudbury* (Scudd., *Rep. Ent. Soc.*, Ont., XXVI., 63); *North Bay* (Walk.).
33. *Podisma variegata*, Scudd. *Lake Simcoe*, *Muskoka* (Walk.); *Tobermory*, Aug. 24, 25, 1901; *North River*, *Algonquin Park*, Aug. 21, 27, 1902.
34. *Melanoplus Bruneri*, Scudd. *Dwight*, *Muskoka*, Sept. 2, 1902.

35. *Melanoplus atlanis*, Riley. Ottawa (Caulf., Fletch., Rep. Exp. Farms, Can., 1888, 63); Sudbury (Scudd.); Rat Portage, Nepigon, Severn R., L. Simcoe, Toronto (Walk.); *Rond Eau*, Aug. 14, 1899; *Pt. Pelee*, Aug. 7, 1901; *Sarnia*, Aug. 12, 1901; *Goderich*, Aug. 19, 1901; *Southampton*, Aug. 20, 1901; *Tobermory*, Aug. 24, 1901; *Johnson's* and *Little Eagle Harbours*, Aug. 22, 23, 1901; *Owen Sound*, Aug. 30, 1901; *Lake Muskoka*, Aug. 27, 1899; *North River, Algonquin Park*, Aug., 1902; *North Bay*, Aug. 12, 1900.
36. *Melanoplus Dawsoni*, Scudd. Toronto, Severn R. (Walk.).
37. *Melanoplus islandicus*, Blatchl. Toronto, Aurora, Lake Simcoe, Severn R., near Lake Kabinakagami (Algoma) (Walk.); *Southampton*, Aug. 20, 21, 1901; *Johnson's* and *Little Eagle Harbours*, Aug. 22, 23, 1901; *Tobermory*, Aug. 24, 1901; *North River* and *Island Lake, Algonquin Park*, Aug. 19-28, 1902; *North Bay*, Sept. 12, 1900.
38. *Melanoplus fasciatus*, Walk. Lake of the Woods (Scudd., Daws., Rep. Geol., 49 par., 343); Toronto, Lake Simcoe, Stony Lake (Walk.); *Point Pelee*, Aug. 7, 1901; *Johnson's* and *Little Eagle Harbours*, Aug. 22, 23, 1901; *Tobermory*, Aug. 24, 1901; *North River, Algonquin Park*, Aug. 23-31, 1902.
- 38a. *Melanoplus fasciatus*, var. *volaticus*, Scudd. Lake Simcoe (Walk.); *Johnson's Harbour*, Aug 22, 1901, 3 ♂♂.
39. *Melanoplus femur-rubrum*, DeGeer. Ottawa, Ont., generally, to north of L. Superior (Caulf.); Ont. (Walk.); *Rond Eau*, Sept. 14, 1901; *Pt. Pelee*, Aug. 7, 1901; *Arner*, Aug. 9, 1901; *Chatham*, Aug. 10, 1901; *Sarnia*, Aug. 12, 1901; *Walpole Id.*, Aug. 13, 1901; *Goderich*, Aug. 19, 1901; *Southampton*, Aug. 20, 1901; *Johnson's* and *Little Eagle Harbours*, Aug. 22, 23, 1901; *Tobermory*, Aug. 24, 1901; *Stokes Bay* and *Burke Id., L. Huron*, Aug. 27, 1901; *Owen Sound*, Aug. 30, 1901; *Lake Muskoka*, Aug. 27, 1899; *North River, Algonquin Park*, Aug. 25-31, 1902; *North Bay*, Sept. 12, 1900.
40. *Melanoplus extremus*, Walk. Algoma, near portage between Lake Kabinakagami and the Matawishguia River (Walk.)
41. *Melanoplus coccineipes*, Scudd. Sudbury (Scudd., Rep. Ent. Soc., Ont., XXVI., 64).

42. *Melanoplus minor*, Scudd. Toronto (Walk.)
43. *Melanoplus collinus*, Scudd. Toronto, Lake Simcoe, Severn R., Hawk Lake (Walk.); *Rond Eau*, Sept. 14, 1901; *Pt. Pelee*, Aug. 7, 1901; *Arner*, Aug. 9, 1901; *Sarnia*, Aug. 12, 1901; *Lake Muskoka*, Aug. 27, 1899; *Dwight, Muskoka*, Sept. 2, 1902; *North River* and *Big Joe Lake, Algonquin Park*, Aug. 25-31, 1902; *North Bay*, Sept. 12, 1900.
44. *Melanoplus bivittatus*, Say. Lake of the Woods (Scudd., Daws., Rep. Geol., 49 par., 343); *North Bay* (Walk.).
45. *Melanoplus femoratus*, Burm. Ont., everywhere (Caulf.); Ont., *North Bay* (Walk.); *Niagara, Rond Eau*, Sept. 14, 1899; *Pt. Pelee*, Aug. 7, 1901; *Arner*, Aug. 9, 1901; *Chatham*, Aug. 10, 1901; *Sarnia*, Aug. 12, 1901; *Walpole Id.*, Aug. 13, 1901; *Goderich*, Aug. 19, 1901; *Southampton*, Aug. 20, 1901; *Johnson's and Little Eagle Harbours*, Aug. 22, 23, 1901; *Tobermory*, Aug. 24, 1901; *Stokes Bay and Burke Id., L. Huron*, Aug. 27, 1901; *Owen Sound*, Aug. 31, 1901; *Lake Muskoka*, Aug. 27, 1899; *Algonquin Park*, Aug. 1902.
46. *Melanoplus punctulatus*, Uhl. Toronto, L. Simcoe (Walk.).
47. *Paroxya floridana*, Thom. *Arner*, Aug. 9, 1901.

THE NORTHWEST (CANADA) ENTOMOLOGICAL SOCIETY.

YOUNG FOLKS' PRIZE COMPETITION.

1. For best collection of injurious and beneficial insects, Dr. James Fletcher will give a prize of \$2.50, or a standard book on insects.
2. For best general collection of insects, \$1.50.
3. For best collection of pressed plants, in which noxious weeds and grasses and their characteristics must be a feature, Dr. Fletcher will give a prize of \$2.50, or a book.
4. For best general collection of plants, \$1.50.

Of these prizes, two will be given by Dr. Fletcher, and two by the N.-W. Entomological Society. The awarding will take place in Calgary immediately prior to the annual meeting of that Society. Further prizes may be given should the exhibits deserve them.

NEW GENERA AND SPECIES OF N. A. FULGORIDÆ.

BY E. D. BALL, STATE AGRICULTURAL COLLEGE, FORT COLLINS, COLO.

Anotia Kirkaldayi, n. sp.—Form and general appearance of *Amalopota Fitchi*, but broader and less definitely marked. Form of *A. Burnetii*, but with a sharp head and blunter elytra. Length, including elytra, 6.5 mm.

Vertex slightly broader than in *Burnetii*, inclined upward, nearly flat, not rounding over at apex as in that species; elytra broader towards apices than in *Burnetii*; venation very similar, but with the median nervure not forked beyond the cross-vein, and the first branch of the post-costal nervure coming off close to the cross-vein and at nearly right angles to the nervure. Costal appendix larger than in *Burnetii*, obliquely truncate posteriorly.

Colour: pale creamy, slightly tinged with testaceous, a pale testaceous stripe runs from the eye forward to the apex of vertex, and another from below the eye downward to the front; elytra milky subhyaline, a faint smoky or testaceous spot near base, a smoky transverse band half way to apex of clypeus, another partial band extending to the sutural margin, down the median to the cross nervure, and then out that to the post-costal; beyond this nearly all the nervures are broadly smoky margined, leaving a light patch in each anteapical cell and a light spot on apex of each apical nervure; the costal margin beyond the middle, the costal nervures, the apical margin, the apical nervures, except their apices and a section of the postcostal beyond the cross nervure, testaceous.

Described from a single specimen collected by the author, at Ames, Iowa.

The custom of commemorating the distinguished workers in Hemiptera in the naming of the Derbidæ seems to me to be a good one, and I am pleased to add to this list the name of our colleague, whose careful nomenclatural work will place our Hemipterological classification at once upon a sound basis of fact such as it would not have otherwise enjoyed for years to come.

Anotia Sayi, n. sp.—Resembling *Burnetii* in form, but much larger, as large as *Otiocerus*. Costal appendage very long; colour yellowish; elytra white, with a transverse fuscous band before the middle. Length, 11 mm. to the tip of elytra.

Vertex but little rounded above, the apex slightly rounder than in *Kirkaldyi*. Second joint of antennæ very large, consisting of a long, flat plate thickest on the margins and studded with fine knobs; elytra very large, venation as in *Burnetii* nearly, the outer branch of the median nervure straight, the cross nervures at the apices of the elytra in a straight line; costal appendage as long as the second joint of antennæ, strap-shaped towards apex, the posterior margin nearly straight, anterior margin sloping off to the base of the costa; the whole appendix curved back across the corium, with the apex on the claval suture.

Colour: pale straw; eyes black; elytra milky at base, a fuscous band at one-third the distance from base, beyond this subhyaline, with the nervures faintly brown as far as the apical nervures. Posterior margin of appendage, and sometimes a spot near the outer corner of scutellum, fuscous.

Described from two females collected at Albion, N. Y., by E. P. Van Duzee.

Patara Vanduzeei, n. sp.—Form and general appearance of *guttata*, but with a smaller front and different venation; brownish purple, with a light line on vertex and pronotum, and light dots around the apex of elytra. Length, 4.75 mm.

Vertex and front together semicircular, about equally margining the eye all around as seen from side, front rising abruptly from clypeus, compressed, the margin slightly thickened; vertex expanded posteriorly; pronotum slightly carinate, broad and nearly parallel margined; venation closely resembling *guttata*, but with four cells between the postcostal and the median before the apical cell. There is a reflexed veinlet from the median into the anal area, and two reflexed veinlets from the outer branch of the mediastinal to the costal. This branch is interrupted just before the apex, making it appear as if the reflexed vein was the end of the nervure.

Colour: vertex white, front and antennæ brownish testaceous; pronotum brownish fuscous, with a broad, median, light stripe; scutellum bright testaceous, sometimes with a pale stripe; elytra brownish purple, the tuberculate nervure of clavus white, a light spot on the apex of each apical nervure and a broad one on the inner reflexed one. Nervures bright testaceous, the three cross nervures before the apical cells fuscous.

Described from three females in the collection of E. P. Van Duzee, from Gowanda, N. Y. The adding of this name to the list is peculiarly

appropriate, in that it adds that of one of our strongest Hemipterists, and at the same time the name of one who has contributed much to our knowledge of the American Derbidæ.

Cenchrea Heidemanni, n. sp.—Resembling *dorsalis* in form, but larger and lighter coloured: pale orange yellow, with the elytra white. Length, 7.25 mm.

Vertex broad, slightly angled with the broad, parallel margined front, margins with distinct, slightly serrate carina; pronotum with the lateral margins broad, wing-like, posterior margin deeply, angularly emarginate; scutellum weakly tricarinate; elytra long; venation simple, all three veins with long narrow forks, the apices of the mediastinal not as strongly angled as in *dorsalis*, the claval nervure and the basal half of the mediastinal tuberculate, the posterior half of costal and the whole apical margin finely serrate.

Colour: pale orange yellow; elytra milky white, below pale.

Described from one female from Effingham, Kansas, collected by E. P. Van Duzee, and another from Washington, D. C., from Otto Heidemann. This is only one of the many fine specimens that Mr. Heidemann has turned over to me for study.

Neither this nor the preceding genus has before been recognized in our fauna. They were both founded on species from St. Vincent Island.

Cenchrea Uhleri, n. sp.—Size and form of *Lamenia Californica* nearly, slightly longer and narrower, much smaller than *Heidemanni*; pale creamy or slightly testaceous yellow, the elytra margined with fuscous. Length, 5 mm.

Vertex distinctly longer than in *Californica*, shorter and broader than in *Heidemanni*, definitely angled with front; front widening slightly below to the large clypeus; elytra long, strictly parallel margined; male plates long, strap-like, slightly widening towards apex.

Colour: pale creamy yellow, slightly washed with tawny, the abdominal segments both above and below black, with light margins; elytra creamy, a round fuscous spot just before the apex of costa, and usually a brownish or fuscous submarginal stripe along the costa, a brownish line along the sutural margin; the tip of the wing often tawny.

Described from six specimens from D. C. and Md. (Heidemann), two from Effingham, Kansas (Van Duzee), and three from Onaga, Kansas (Crevecœur).

Lamenia obscura, n. sp.—Form and general appearance of *vulgaris* nearly, usually slightly smaller and paler. Readily separated on the male genitalia. Length, 4 mm.

Vertex short, sloping, half wider than long, separated from front by a slight carina; front rather broad, nearly flat, a faint median carina; clypeus convex in both diameters, rather prominent; median carina much elevated, acute; elytra about as in *vulgaris*, not as strongly sinuate on costa.

Colour: slaty black, pruinose, giving this species a powdered gray appearance. Head black, the carinate margin of vertex in front pale, lateral carinae of pronotum pale. Elytra slaty at base, smoky, subhyaline at apex, a spot on costa, where the mediastinal nerve touches it, and the two transverse nervures at the bases of the apical cells light. Legs pale; rostrum pale, apical segment black.

Genitalia: last ventral segment in male transverse, not enlarged, posterior margins straight; plates widely separated at base by an equilaterally triangular notch, their inner margins confluent from the apex of notch to the upturned tips, together transversely convex, forming a long, nearly parallel margined trough with a rounding apex. Their apices are furnished with long slender teeth set at right angles to the plate. In the normal position these teeth cross each other and close the end of the trough.

Described from twenty-two specimens taken at Greeley, Colo., by the author, and two specimens from How Creek and Lake Worth, Fla., in the collection of Mr. Heidemann.

Lamenia inflata, n. sp.—Form of *vulgaris* nearly, slightly longer and narrower, dark smoky brown, paler on pronotum and face. Length, 4.5 mm.

Vertex rather narrow, rounding to the retreating front; front full, without a median carina; elytra long and narrow, distinctly notched at the junction of the mediastinal and costa; venation as in *Californica*.

Colour: vertex, front and pronotum pale testaceous brown; clypeus smoky brown; elytra dark smoky brown, the costal incision and the transverse nervures before the apex faintly marked with light; legs and rostrum pale.

Genitalia: last ventral segment in the male longer than wide, convex, thickened, the posterior margin sinuate; plates distant from each

other at base, long, flat, narrow at base, gradually widening to the bluntly rounding apices, the apical spines just touching each other.

Described from eight specimens in the author's collection taken in Hayti by R. J. Crew.

Peltonotellus rugosus, n. sp.—Form and general appearance of *histrionicus* nearly, the vertex shorter and the venation reticulate. Length: ♀, 3.5 mm.; ♂, 2.5 mm. Width: ♀, 1.3 mm.; ♂, .9 mm.

Vertex shorter than in *histrionicus*; clypeus continued in same plane as front at the base, then sloping sharply backwards, the basal portion overhanging the rest in the form of a bluntly-pointed tubercle; elytra short, truncate; venation distinct, the veins raised and densely reticulate.

Colour: gray or fuscous maculate, a broad, pale yellow median stripe on vertex; pronotum and scutellum margined by four pairs of black dashes; vertex with a pair of ocellate spots at base, and the margins mostly dark lined; front pale yellow, sometimes irregularly washed or marked with dusky, lateral compartments black, with the pustules white; clypeus black, the base and a line down to the apex of the tubercle light; lateral areas of pronotum and scutellum dark, with pustules light; elytra brownish fuscous, nervures light; abdomen above with a narrow median and three pairs of lateral stripes, the two outer pairs broad and pustulate; below, pale straw in the female, the femora spotted and the tibiæ lined with fuscous, the anterior pair much the heaviest. In the male the legs are always red, with more or less of fuscous marking. In some specimens the whole under surface, including clypeus, is bright red.

Described from twenty-four specimens collected in various parts of Colorado.

Peltonotellus bivittatus, n. sp.—Resembling *quadrivittatus* in general form and colour, the front much narrower and black lined. Size of *rugosus*.

Vertex three times as wide as its median length, two-thirds the length of the pronotum, front long and narrow, space between the lateral carinæ nearly twice as long as its middle width, only one-fourth wider in the middle than at the ends; clypeus abruptly rounding back, nearly right angled with front; elytra either coriaceous and only about half the length of the abdomen, venation indistinct, or else subhyaline, and much longer than the abdomen, the nervures distinct.

Colour: striped yellow and black, the yellow shading out to green on the vertex and front, a median line, broad in front, narrowing out behind, extending from the vertex to the tip of the abdomen, and a pair of oblique lines rising under the eyes and meeting the median line on the last abdominal segment, yellow; vertex green, margin and pair of spots at base black; front green, the lateral carinæ deep shining black; pustules on lateral areas of pronotum and scutellum black, lateral carinæ of scutellum and a pair of stripes just within them black; legs pale yellow.

Described from two specimens from Colorado, four from Nebraska, three from Kansas, and one from Iowa. One Kansas specimen was received from Crevecoeur; all the rest were collected by the author.

Kelisia salina, n. sp.—Form of *pallidula* nearly, but longer and narrower, resembling *crocea*, but much smaller, pale, with the carinæ of front margined with black. Length, 3.5 mm.

Vertex strongly carinate, one-third longer than wide, as long as the pronotum; front broader proportionally than in *crocea*, the margin slightly and regularly rounding, but little narrowed above; elytra long and closely appressed behind, the apex broadly rounded; venation as in *crocea*, the third apical nervure twice forked, the nervures studded with coarse dark hairs.

Colour: front pale smoky, the carinæ light, narrowly margined with black, which extends into the lateral foveæ of the vertex; basal part of vertex creamy; pronotum pale, with more or less of smoky clouding on the disc; scutellum creamy, often trilineate with pale. Legs and all below, except ovipositor and a few spots along margin, pale in the female, abdomen all dark in male.

Described from twenty-four specimens from various places in Colorado.

Kelisia parvula, n. sp.—Size of *pallidula* nearly, but with broader elytra, a shorter species than *salina*, with an unmarked front; front and above entirely pale. Length 3.25 mm.

Vertex weakly carinate, broad, but little longer than wide, rounding to front; front as in *salina*; elytra longer than abdomen, broad at apex; venation distinct, nervures strong and slightly setigerous, the third apical veinlet but once forked near the apex.

Colour: pale straw or whitish; vertex and scutellum tinged with orange, the abdomen in male smoky brown and black.

Described from one female from Coolidge, Kansas, and a pair from Ames, Iowa, all collected by the author.

MEGAMELANUS, n. gen.

Resembling *Megamelus*, but with the front of equal width above and below and the vertex sharply angled in front. Resembling *Delphacinus*, but with the side keels of the pronotum attaining the hind margin. Vertex 5-angular, but with the lateral foveæ depressed and their inner carinæ strong and meeting at the sharp apex, giving it the appearance of being acutely triangular; front broad, nearly rectangular, median carina distinct, not forked, a trifle the widest in the middle, the lateral margins gently evenly curving, the apical margin carinate just above the deep clypeal suture; clypeus small, rounding, without carinæ; pronotum shorter than vertex, strongly tricarinate, the lateral pair just inside and parallel with those on vertex, extending to the posterior margin; elytra commonly brachypterous, covering the second abdominal segment. In the macropterous form long and broadly rounding posteriorly; venation nearly as in *Megamelus*.

Type of the genus *M. bicolor*.

Megamelanus bicolor, n. sp.—General appearance of *Delphacinus mesomelas*, but with a sharper vertex and straight lateral carinæ on pronotum. Length: macropterous form, 3 mm.; brachypterous, ♀, 2.5 mm.; ♂, 1.6 mm.

Vertex flat, acutely triangular on the disc, slightly longer than the pronotum, more than half its length in advance of the eyes; median carina weak, obsolete before the middle; face slightly acutely angled with the vertex; front nearly half longer than wide, the carinæ sharp, narrow; pronotum sharply carinate, slightly emarginate posteriorly; elytra one-third longer than the vertex and pronotum in the brachypterous form, their apices rounding; nervures simple, distinct, distinctly longer than the abdomen in the macropterous form, broadly rounding at apex, anteapical cells variable, apical veinlets straight and simple.

Colour: females varying from a pale to a very bright straw colour, male pale straw colour; elytra nearly white, the abdomen both above and below clypeus and under side of thorax black. Legs black, the tip of both femora and tibiæ pale, tarsi pale.

A few males were found that mimic the females in size and colour. These were mostly parasitized, and it is possible that the others had been.

Described from twenty-five specimens from various parts of Colorado, and one female from California.

BOSTÆRA, n. gen.

Resembling *Stobæra*, but with a much broader vertex and front; vertex and front broader than in *Laccocera*, front bicarinate. Head transverse, wider than pronotum; vertex parallel margined, over three times as wide as long, not extending in front of eyes; front six-angled, widest at the lower corner of the eye, where it is a trifle wider than its median length, two and one-half times as wide as at apex, median carina forking at one-fourth its length from the apex and regularly diverging until its forks inclose over half the width at base; clypeus bearing an acutely-tipped, cone-shaped tubercle; antennæ very large, prominent, basal joint flat, second flat above, rounding below and tuberculate; pronotum transverse, slightly angularly excavated behind, lateral carinæ curving around behind eyes, not reaching the posterior margin; elytra about as in *Stobæra*, obliquely truncate behind, nervures with setigerous tubercles; tarsal spur broad, short, almost spoon-shaped.

Type *B. nasuta*.

The remarkably broad head, bicarinate front, and the "nose" on the clypeus, render this a very distinct and easily-recognized genus.

Bostæra nasuta, n. sp.—Slightly resembling *Laccocera vittatipennis*, but with a much broader head; pale creamy yellow, with a black band at apex of elytra and another before it. Length, 5 mm.

Vertex evenly rounding to the slightly-retreating front, slightly shorter than pronotum, not at all in advance of the eyes; elytra much longer than abdomen, as broad as in *S. tricarinata*, obliquely truncate at apex, the outer angle acute.

Colour: pale creamy yellow, the vertex and front shading to brownish on a line below the eyes. This line is margined below with white, which again shades out into brownish fuscous on the clypeus. Scutellum orange; elytra subhyaline, a spot on the suture before the apex of clavus; a band on apex and an oblique stripe before it, dark smoky brown or fuscous.

Genitalia: male plates strap-shaped, their inner margins notched before the apex; apical margins obliquely, roundly excavated, their outer angles acute, upturned.

Described from ten examples from Holly, Antonito and Fort Collins, Colo., all collected by the author.

A NEW BEE OF THE GENUS BOMBOMELECTA.

BY T. D. A. COCKERELL, EAST LAS VEGAS, N. M.

Bombomelecta Arizonica, n. sp.—♀. Length about 11 mm., black; head, thorax and legs with dull white hair, having a faint yellowish tinge; black hair on cheeks, lower sides of face, labrum and mandibles; hair of pleura, except its upper part, black; a conspicuous band of black hair between the wings; hair of anterior legs long and black, but the tarsi more or less silvery, and the femora with a conspicuous tuft of white hair near the end behind; middle tibiæ and tarsi largely silvery-white on the outer side, but the white and black pubescence are mixed, so as to produce a speckled effect; hind tibiæ and tarsi similar, except that the tibiæ have the outer apical half black; tegulæ large, black, punctured; wings pale brownish, nervures piceous; abdomen heart-shaped, with sparse black hair, and conspicuous clear-cut patches of white hair; first segment with a broad band of yellowish-white erect or suberect hairs, interrupted in the middle; first to fifth segments with lateral patches of appressed snow-white hair, that on the second segment broad and deeply notched behind. Clypeus shining and strongly punctured; front rough and dull; antennæ black, fairly long, last joint truncate; labrum about as broad as long; maxillary palpi six-jointed, the last joint minute; mandibles rather slender, with a low tooth on the inner side about the middle; scutellum with two short pyramidal spines; pygidial plate long and very narrow; apical ventral segment considerably but very narrowly produced; claws of hind legs bifid, not dilated. Spurs black, gently curved.

Hab.—Tempe, Arizona, end of March, 1902, visiting flowers of *Spharalcea variabilis*. The flowers were also visited by *Halictus* and the honey-bee. This species is particularly interesting because in form, pubescence and colour it almost exactly imitates *Melecta grandis* from Algeria, a specimen of which I possess through the kindness of Mr. Vachal. The only obvious superficial difference is in size, the Algerian bee being considerably the larger. The significance of this appears when we recall that Tempe was selected as the location of the experimental date-palm orchard, because its climate most resembles that of Algeria and other parts of North Africa, the home of the date. *B. Arizonica* completely breaks down the supposed difference in pubescence between *Melecta* and *Bombomelecta*; among the known species it is closest to *B. Alfredei*.

CLASSIFICATION OF THE FOSSORIAL, PREDACEOUS AND PARASITIC WASPS, OR THE SUPERFAMILY VESPOIDEA.

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(Paper No. 9.—Continued from p. 231.)

FAMILY XXXII. — Bethylidæ.

1830. Proctotrypides, Family (*partim*), Leach. Edinb. Ency., IX., p. 145.

1830. Mutillidæ, Family (*partim*), Leach. *Opus cit.*, p. 147.

1839. Ctenoptera, Tribe 6, Haliday. Hym. Syn., p. iii.

1839. Bethyllidæ, Family 20, Haliday. *Opus cit.*

1877. Ctenoptera, Tribe 12, Förster. Ueber d. Syst. Werth d. Flügel., p. 20.

This family was first defined by that astute British systematist, A. H. Haliday, who, as early as 1839, very correctly placed the family among the Fossores.

In 1893 the writer, in his Monograph of the North American Proctotrypidæ, followed the views of Prof. Westwood, and treated these insects as a subfamily in the Proctotrypidæ. Since that time, however, the extensive studies I have made into all families of the Hymenoptera have given me a much broader and more thorough knowledge of the families and their affinities, and I am now convinced that Haliday was right, that these insects are allied to the fossorial wasps, and have nothing to do with genuine Proctotrypoids; they are clearly allied to the *Chrysididæ*, through the *Cleptinæ* and *Ameriginæ*, and to the *Sapygidæ*, *Tiphidiæ*, *Cosilidæ*, *Thynnidæ*, *Myrmosidæ* and *Mutillidæ*,—all *parasitic* families.

The family *Trigonalidæ*, too, which is usually classified with the terebrant Hymenoptera, also belongs to the same category, being undoubtedly allied to the *Bethylidæ* and the *Sapygidæ*, the two-jointed trochanters, the long multiarticulate antennæ, and the superficial resemblance to genuine ichneumonids having misled most systematists as to its true position.

In this connection it may be well to call special attention to the new Bethylid genus, *Probethylus*, discovered by Mr. E. A. Schwarz, in Arizona, with 23-jointed antennæ, and to the genus *Sclerogibba*, Stefani,

with 26-jointed antennæ, since these genera differ so widely in antennal characters from others in the group, and apparently emphasize the affinities between these wasps.

Table of Subfamilies.

- Wingless forms.....3.
 Winged, the hind wings with a lobe at base; front wings with one or two basal cells.
 Head not oblong.....2.
 Head oblong.
 Antennæ inserted at the clypeus, usually 12- or 13-jointed, rarely 23- or 26-jointed; front femora usually more or less swollen.....Subfamily I.—Bethylinæ.
 2. Head globose or rounded; front wings with a lanceolate stigma; front tarsi in ♀ never chelate; antennæ in ♀ 13-jointed, in ♂ 10-jointed.....Subfamily II.—Emboleminæ.
 Head transverse or subquadrate; front wings usually with a large stigma; front tarsi in ♀ frequently chelate; antennæ 10-jointed in both sexes..... Subfamily III.—Dryininæ.
 3. Front femora much swollen.
 Head oblong; antennæ usually 12- or 13-jointed, alike in both sexes, rarely 23-26-jointed. I.—Bethylinæ
 Head transverse or subquadrate, or globose.
 Head globose; antennæ in ♀ 13-jointed; front tarsi normal..... II.—Emboleminæ.
 Head transverse or subquadrate; antennæ 10-jointed; front tarsi in ♀ chelate..... III.—Dryininæ.

SUBFAMILY I.—Bethylinæ.

This subfamily may be divided into two very distinct tribes :

Table of Tribes.

- Antennæ 23- to 26-jointed..... Tribe I.—Sclerogibbini.
 Antennæ 12- to 13-jointed..... Tribe II.—Bethylini.

TRIBE I.—Sclerogibbini.

In this tribe only two genera are known, and they are easily recognized from other Bethyids by the multiarticulated antennæ, the antennæ being 23- or 26-jointed. In the Bethylini the antennæ are never more than 13-jointed.

Table of Genera.

1. Males.....2.

Females.

Wingless.

Antennæ 26-jointed; ocelli wanting (♂ un-

known..... (1) *Sclerogibba*, Stefani.(Type *S. crassifemorata*, Stef.)

2. Front wings with a closed marginal cell
- without*
- discoidal cells;

antennæ 23-jointed (♀ unknown)..(2) *Probethylus*, Ashmead, g. nov.(Type *P. Schwarzii*, Ashmead, MS.)

TRIBE II.—Bethylini.

The antennæ are 12- or 13-jointed, alike in both sexes. Among the females, wingless forms are common, and in many cases are totally different from the males, so that the sexes are not easily correlated.

Many of them, too, were it not for their oblong heads, could be easily mistaken for apterous females in the families Thynnidæ and Mutillidæ.

Table of Genera.

1. Males.....18.

Females.

Wingless forms.....2.

Winged forms.....10.

2. Head
- with*
- ocelli.....9.

Head *without* ocelli; antennæ 13-jointed.....3.

3. Metathorax quadrate or nearly, not much constricted at the base..5.

Metathorax not quadrate, much constricted or strangulated at base..4.

4. Scutellum present; mandibles 3- or 4-dentate; maxillary palpi

6-jointed.....(1) *Pristocera*, Klug.(Type *Bethylus depressa*, Fabr.)

Scutellum wanting; mandibles 3-dentate; maxillary palpi 6-

jointed..... (2) *Isobrachium*, Förster.(Type *Omalus fuscicornis*, Nees.)

5. Scutellum present; metathorax quadrate or trapezoidal.....6.

Scutellum wanting; metathorax rounded off

posteriorly.....(3) *Ecitopria*, Wasmann.(Type *E. crassicornis*, Wasm.)

6. Mandibles 2- or 3-dentate; maxillary palpi 4-jointed.....7.

Mandibles 4-dentate; maxillary palpi 5-

jointed.....(4) *Scleroderma*, Latreille.(Type *S. domesticus*, Latr.)

-
7. Mandibles 2-dentate 8.
 Mandibles 3-dentate (5) *Dissemphalus*, Ashmead.
 (Type *D. xanthopus*, Ashm.)
8. Maxillary palpi normal ; labial palpi 3-
 jointed (6) *Ateleopterus*, Förster.
 (Type *A. Försteri*, Kirchner.)
 Maxillary palpi deformed ; labial palpi 3-
 jointed (7) *Apenesia*, Westwood.
 (Type *A. amazonica*, Westw.)
9. Antennæ 12-jointed ; maxillary palpi 4-
 jointed (8) *Cephalonomia*, Westwood.
 (Type *C. formiciformis*, Westw.)
10. Front wings *with* a stigmated marginal vein and a marginal cell, the
 radial vein always well developed 13.
 Front wings *without* a stigmated marginal vein and marginal cell, the
 radial vein not at all or only slightly developed, sometimes wholly
 absent 11.
11. Front wings *with* a short linear marginal vein and a short radius . . 12.
 Front wings *without* a marginal and a radial vein.
 One basal cell ; antennæ 13-jointed . . (6) *Ateleopterus*, Förster.
 No basal cell ; antennæ 12-jointed . . (8) *Cephalonomia*, Westwood.
12. Two basal cells about of an equal length.
 Antennæ 13-jointed (9) *Laelius*, Ashmead.
 (Type *L. trogodermais*, Ashm.)
 Antennæ 12-jointed (10) *Bethylus*, Latreille.
 (Type *B. cenopterus*, Latr.)
13. Basal vein *with* a branch directed backwards, sometimes forming a
 small closed cell ; parastigma usually present 17.
 Basal vein *without* such a branch ; no parastigma.
 Front wings with an *incomplete* or open marginal cell 14.
 Front wings with a complete marginal cell ; antennæ 13-jointed.
 With *one* discoidal cell (11) *Sierola*, Cameron.
 (Type *S. testaceipes*, Cam.)
 With *two* discoidal cells (12) *Eupsenella*, Westwood.
 (Type *E. agilis*, Westw.)
14. Mesonotum *without* furrows, or the furrows are incomplete and
 indistinct 16.

- Antennæ 13-jointed.
One discoidal cell (11) Sierola, Cam.
Two discoidal cells (12) Eupsenella, Westwood.
23. Basal nervure *without* a backward-directed branch; no parastigma . . . 24.
 Basal nervure *with* a branch directed backwards; a parastigma . . . 27.
24. Mesonotum *without* furrows, or the furrows very indistinct 26.
 Mesonotum *with* furrows distinct 25.
25. Antennæ 13-jointed, simple, not ramose.
 Scutellum bifoveate at base; maxilla terminating in *two* lobes (14) Epyris, Westwood.
 Scutellum with a transverse furrow or fovea at base; maxilla with three lobes (13) Mesitius, Spinola.
- Antennæ 13-jointed, *ramose* (15) Calyoza, Westwood.
 (Type *C. staphylinoides*, Westw.)
26. Antennæ 12-jointed; eyes hairy (16) Anoxus, Thomson.
- Antennæ 13-jointed.
 Mandibles long, slender, bifid at apex (7) Apenesia, Westw.
 Laelius, Ashmead.
- Mandibles 4- to 6-dentate.
 Scutellum bifoveate at base (13) Mesitius.
 Scutellum with a transverse grooved line or furrow at base (14) Epyris, Westwood.
27. Antennæ 12-jointed (16) Perisimus, Förster.
 Antennæ 13-jointed (17) Goniozus, Förster.

A TORTOISE-BEETLE NEW TO QUEBEC.

BY THE REV. THOS. W. FYLES, LEVIS, P. Q.

In July last I noticed that the leaves of the burdocks on the Heights of Levis were riddled as if from a discharge of small shot. On examination, I found that the damage to the leaves was caused by numerous larvæ of a species of *Cassida*. The creatures were there in strength, each supporting, by means of the forked prolongation of its anal segment, its "stercoraceous parasol." Towards the end of the month the grim-looking pupæ were to be seen, bristling round their edges with white branched spines, and attached to the leaves by a natural cement. In the present month (August) the beetles have appeared. They are about eight millimetres in length and five millimetres in breadth. The elytra and the thoracic shield are pea-green and are closely indented,

The body-colour is dark brown, approaching to black. The antennæ are moniliform and somewhat clavate; for part of their length they are pale green and for the rest light brown. The thighs are brown, and the tibiæ and tarsi are pale green. The tarsi are four-jointed.

This insect, I take it, is the *Cassida viridis* of Linnæus, advanced from Europe. It is in such numbers that it is evidently well established—is come to stay; and, as it feeds on the burdock and Canada thistle, nobody, I presume, will object to its advent.

HYDRÆCIA NELITA, STRECKER.

BY HENRY H. LYMAN, MONTREAL.

In Supplement No. 1 to his work "Lepidoptera, Rhopaloceres and Heteroceres, Indigenous and Exotic," dated Sept. 15th, 1898, Dr. Herman Strecker described a species under the above name as follows:

"At first glance might be taken for a small *Nitela*, but it is a darker, warmer colour, more towards a rich chestnut. The t. p. is not so conspicuous, and is much more upright, and its course is rather from the costa outwardly oblique than inwardly oblique. One example has the space from the base to t. p. chestnut brown, exteriorly the t. p. is accompanied by a broad, paler ashen shade, beyond which the brown again prevails. In another the whole wing is brown, the t. p. only being discernible on the closest inspection. Beyond what I have mentioned, the differences between this and *Nitela*, excepting size, are not very marked. Expands one inch. Types, two examples from Chicago, Illinois."

When I attended the annual meeting of the A. A. A. S. at Pittsburg, at the end of June and beginning of July last, I took with me, among other things, two of my types of *Gortyna Erata*. When I showed my specimens to Dr. Holland, he immediately expressed the opinion that these two belonged to *Necopina*, showing that he also saw the close resemblance to that species.

When, however, I showed them to Dr. J. B. Smith, he asked me if the flown specimen which Mr. Winn had given to Mr. Bird was of the same species, for if so, the species was *Nelita*, Strecker. I immediately arranged to visit Reading, in order to see the types of Strecker's species, and upon comparing the types of *Erata* with them, I was forced to the conclusion that Dr. Smith was right.

I greatly regret having created a synonym, but I have sinned in the best of entomological company, and do not think I can be blamed for not having recognized in my beautiful bred specimens the species so inadequately described by Dr. Strecker from a pair of flown dwarfs.

THREE NEW GOMPHINES.

BY JAMES G. NEEDHAM, LAKE FOREST, ILL.

Herewith I offer descriptions of three new species of dragon-flies of the subfamily Gomphinae of Odonata. Figures of the appendages of all will appear in my forthcoming handbook of the dragon-flies of North America.

Gomphus lentulus, n. sp.

Length 49 mm., abdomen 34 mm., hind wing 29 mm.

Colours obscure (due in part to fading of specimen); face obscure yellowish, shining; frons above and occiput and the ridges above the lateral ocelli yellow, the remainder of the vertex brownish. Prothorax brownish, with a double median spot of yellow on the dorsum. Thorax obscure yellowish, with a faint indication of a pair of narrow stripes of brown beside the middorsal carina, and of broader antehumeral and humeral stripes; a brown pale line on the third lateral suture. Legs black, hairy (male), with coxae, trochanters, external (dorsal) face of the tibiae and of the two basal segments of the tarsi yellow. Wings hyaline, costa yellow, stigma fulvous, covering 5-6 cells; antecubitals 13-14 on the fore wings, 9-10 on the hind wings; postcubitals 10-11 on all wings; no anal loop, but veins A₁ and A₂ are widely separated at base, and there is a single elongated cell between, as is usual in *G. villosipes*; between the anal triangle and this cell there is but one other cell bordering on the anal vein.

Abdomen brownish, broadly streaked with yellow longitudinally on segments 1-4, becoming suffused with rufous on segments 7-9; segment 10 and appendages yellow; segment 9 cut very obliquely at apex, longer on the dorsal side, its lateral margins little dilated. Superior appendages shorter than the inferiors, strongly divergent, straight, scarcely tapering, suddenly obliquely truncate on end, with an acute internal angle and a broad, black caruncle under the obtuse external angle. Inferior appendage roundly divided, its forks not wider apart than are the two superior appendages, straight, tapering to the darker coloured, sharply-upcurved tips.

A single male specimen, collected end of June, 1898, five miles north-east of Flora, Ill., Little Wabash River, by J. F. Garber, in the collection of Mr. Chas A. Hart, who has very kindly offered me the specimen for description. It belongs to the subgenus *Arigomphus*, and *G. pallidus* is perhaps its nearest ally.

Gomphus cavillaris, n. sp.

Length 41 mm., abdomen 30 mm., hind wing 24 mm.

Face yellow, tinged with brown on the sutures and on the middle of the labrum. Vertex blackish, except the postocellar ridge and a narrow basal ring around each antenna. Occiput yellow, straight, or very slightly convex at its ends, with a thin fringe of black hairs.

Prothorax brown, with median and lateral spots of greenish yellow. Dorsum of the thorax greenish yellow, with a triangular median stripe of brown, divided on the carina, greatly dilated below, almost interrupted on the collar. Humeral and antehumeral stripes distinct, the latter isolated above. Sides greenish yellow, with narrow pale brown stripes on sutures. Legs entirely reddish beyond the trochanters, with black spines and black-tipped claws. Wings hyaline, costa yellow, stigma fulvous. Antecubitals of fore wing 9, of hind wing 7, postcubitals 6-7 on all wings; the 1st and 4th antecubitals of the hind wings hypertrophied.

Abdomen brown, with ill-defined middorsal stripe of yellowish green, disappearing on segments 8 and 9. Sides of segments 1 and 2, including the auricles and base of 3, greenish yellow; indistinct lateral paler marks also on 4-6; sides of 7-9 bright yellow inferiorly, superiorly fulvous; 10 brown, paler below; appendages brown. Apex of segment 8 cut very obliquely, longer on the dorsal side.

Appendages brown, the superiors scarcely longer than the inferiors, and scarcely more divergent, obliquely truncate, with the inner angle produced into a long, straight, posteriorly-directed point, the external angle also acute, short, situated at two-thirds their length. Viewed from the side, the external angle presents an inferior tooth, and beyond it on the outer margin are two other smaller teeth before the apex, one near the

tooth first named, with a distinct notch intervening, and the other near the apex; branches of the inferior appendage tapering, upcurved, their tips appearing outside the inner angle of the superiors.

Vulvar lamina of female completely divided into two short, broad lobes, and hind femora each with a double row of less numerous, much longer and stronger spines, otherwise similar to the male.

One male, Ft. Reed, Fla., 6th March, 1876, collected by Professor J. H. Comstock, and in the Cornell University collection; and a number of specimens of both sexes, Gotha, Fla., 27th and 28th February, collected by Miss Matilda Wichtendahl, and in the collection of Mr. C. C. Adams.

Our smallest species; as closely related to *G. militaris* as to any other.

Ophiogomphus phaleratus, n. sp.

Length 47 mm., abdomen 35 mm., hind wing 30 mm.

Face yellow, vertex black, except two rings on the base of each antenna, two minute crescents surrounding the lateral ocelli in front, the ends of the postocellar ridge and a spot on the rear, including the middle of this ridge; occiput yellow, with a thin fringe of brown hair on the straight hind margin.

Thorax thinly pubescent; prothorax brown, with a yellow twin spot on the middle and a larger yellow spot on each side. Dorsum of thorax with a moderate stripe of brown, divided by yellow on the middle of the carina, contracted on the collar; humeral and antehumeral stripes of brown, confluent above and below, around a narrow dividing line of yellow. Sides of thorax yellow, with narrow lines of pale brown on the sutures. Legs yellow, a blackish spot on the apical fourth of the femora above, tibiae and tarsi black, with a yellow stripe on the external face of the tibiae; knees yellow. Wings hyaline; costa yellow, stigma pale brown; antecubitals of the fore wing 31, of the hind wing 9, postcubitals of all wings 9-10.

Abdomen brownish, with a row of broad spots on the dorsum of segments 1-9, covering segment 1, restricted to the basal two-thirds of segments 2-9, best defined on the middle segments. Segment 10 wholly

yellow. Sides of segments 1-3 yellow, including the auricles; sides of 7-9 broadly yellow, with apical ventral angles bordered with black; appendages yellow.

Appendages yellow, the superiors one-third longer than the inferior, hardly as long as the 9th abdominal segment. Viewed from above, the superiors are arcuate, approximated at apex around an oval space, but not quite touching, smoothly rounded externally; the inferior shows an oval apical cleft, whose depth equals one-third the length of that appendage. Viewed from the side, the superiors are broad at base, suddenly contracted just beyond, and then cylindric and regularly declined to apex, with the superior margin regularly curving from base to apex; a straight row of half a dozen black denticles beneath the apical third; apex obtuse. Inferior declined at base and upcurved at apex, its superior margin forming a regular semicircular curve; apices hidden between superiors, each bearing a little superior tooth.

A single male specimen collected at Corvallis, Oregon, June 6th, by Prof. A. B. Cordley, by whose generosity the specimen is now in the collection of the writer.

NOTES.

We regret to record the death of MR. R. J. WEITH, of Elkhart, Indiana, which took place on Sunday, September 21st, after an illness of only two days, from appendicitis. Mr. Weith was born in Prussia, on the 15th of September, 1847. At the age of twenty-five he came to America, and after visiting many of the large cities in the east and south, finally settled at Elkhart, where he lived for about a quarter of a century. For many years he devoted himself to the study of entomology and the collection of insects, especially Hymenoptera, and made many notable captures.

MR. OTIS W. BARRETT, formerly of Tacubaya, Mexico, is now at the Agricultural Experiment Station, Mayagüez, Porto Rico, and desires his correspondents to take note of his new address.

THE ANNUAL MEETING of the Entomological Society of Ontario will be held in London, on Wednesday and Thursday, October 29th and 30th.

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No. 11.

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EDITED BY

REV. C. J. S. BETHUNE,

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1902.

TRINIDAD

The advertiser is now collecting in the above Island, and would be glad to hear from any one requiring perfect entomological specimens, of any order, at very reasonable prices. Address :

H. D. CHIPMAN, Port of Spain, Trinidad, Br. W. I.

EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

LEPIDOPTERA.—I desire to exchange with collectors in all parts of N. A., particularly N.-W. and S.-W. JOHN L. HEALY, 1137 Pratt Ave., Chicago, Illinois.

LEPIDOPTERA.—Would like Parnassius of the world, except Apollo and Sminthens. Also good N. American Lepidoptera. Have to offer : Chion. Brucei and oeno, Erebia magdala and callias, Colias Scudderi, melitæa, Brucei, minuta and anjicia, Lycæna shasta, Pamphila Snowi, and others. JOHN & HURD COMSTOCK, 1572 Ridge Ave., Evanston, Illinois.

LEPIDOPTERA.—Western and northern Argynnis especially desired, but will exchange for anything new to collection or for perfect specimens of less rare material. I offer Chionobas oeno, Brucei, Uhleri and Chryxus ; Colias Meadii, Scudderi and Alexandra ; Melitæa Brucei, minuta, etc. Also many Argynnis and local species of Catocalæ. ARTHUR J. SNYDER, Belvidere, Illinois, U. S. A.

LEPIDOPTERA.—I would like to correspond and exchange with some new beginners. PHINIUS WHITING, 106 Fairmount St., Lowell, Mass., U. S. A.

LEPIDOPTERA.—Superb examples of *Hemileuca tricolor*, *Catocala chelidonia* and *babayaga*, *Pam. python*, *Apatura leilia* and other extreme rarities in exchange for species of equal interest. O. C. POLING, Quincy, Ill.

I WILL make collections of Lepidoptera in the Mississippi Valley in exchange for specimens of other localities. Address : G. H. ROSS, Burlington, Iowa.

WILL COLLECT insects of all orders from this locality for entomological publications not in my library. REV. J. W. STACEY, Clarksville, Mich.

WANTED.—Psyche, Vol. IV., parts 138 to 140, and Index; Vol. V., parts 145 to 148. Will exchange any parts of Vols. 1, 2 and 3 for these. R. F. PEARSALL, 1334 Dean St., Brooklyn, N. Y.

BRACHYINI.—Specimens from all parts of the world wanted. GERMAIN BEAULIEU, P. O. Box 2168, Montreal, Canada.

ARGYNNIDS WANTED.—Arg. *atlantis*, *electa*, *leto*, *cypris* and *aphrodite*. Have numerous duplicates for exchange, chiefly amongst Noctuidæ. F. H. WOLLEY DOD, Box 225, Calgary, Alberta.

WANTED.—Lepidoptera from Canada and U. S. A., in papers, correctly named, in exchange for Lepidoptera of the world, correctly named. W. NEUBURGER, Halensee-Berlin, Lutzenstrasse 10, Germany.

WANTED.—Fresh specimens of all the species of *Andrena* to be met with in various localities in North America north of Mexico ; this for the purpose of working over the genus. Address : L. BRUNER, care University of Nebraska, Lincoln, Neb.

PLUSIAS WANTED.—Having just described some new Plusias, all from females, I wish to obtain males of these and specimens of others in which my series is short. Very liberal returns. DR. R. OTTOLENGUI, 80 West 40th Street, New York.

EUROPEAN COLEOPTERA.—I have a large quantity of European Coleoptera which I wish to exchange for American. Lists furnished. PAUL J. ROELOFS, 90 Rue van Straelen, Antwerp, Belgium.

TENTHREDINOIDEA.—Sawflies from all parts of Canada desired for study, with view to publication of catalogue. Material will be returned or exchanges made. W. HAGUE HARRINGTON, P. O. Dept., Ottawa.

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No. 11

THE LIFE-HISTORY OF THE VARIABLE CUTWORM, *MAMESTRA ATLANTICA*, GRT.

BY DR. JAMES FLETCHER AND ARTHUR GIBSON, OTTAWA.

In the Report of the Dominion Entomologist for 1901 a notice was given of this insect, the moth of which has for some years at Ottawa been one of the commonest species of the genus found flying during the summer. Any species as abundant as this is must be injurious, should the caterpillars at any time attack a cultivated crop. The larvæ have occasionally been found in vegetable gardens, around peas and beet root, but no injury as yet has been noticed. The finding of a cluster of eggs last year by Mr. Gibson gave an opportunity of studying the life-history, which is herewith submitted.

On the 6th June, 1901, a batch of about 90 eggs of *Mamestra atlantica*, Grt., was found at Ottawa on *Lonicera caprifolium*, Linn. The eggs were laid on the upper surface of a leaf, in a compact heap of three layers.

Egg.—Dome-shaped, slightly smaller at the base than just above it, where it is widest; height, 0.4 mm.; width, 0.6 mm. In general appearance similar to the eggs of *Peridroma saucia*, Hbn., which have been so often figured. The micropyle is conspicuous, surrounded by about 5 rings of large cells. The ribs, about 24 in number, all divide once, and some of them twice, before they reach the base. The large cells, which show plainly above the point where the ribs divide, occur over the whole surface of the egg, forming a network connecting the ribs. When found, the eggs were of a pinkish shade.

The eggs hatched during the morning of the 10th June.

Stage I.—Length after hatching, 2.3 mm., of a dirty whitish colour, alimentary canal showing dark through the skin. After feeding, the colour is pale green. Head 0.4 mm., wide, large, rather flat in front, pale brown; mandibles reddish; ocelli dark; hairs on face black, each of which is

encircled by a dark brown spot. Besides these dark spots, there are smaller dots and short dashes of brown on the face, particularly near vertex. Cervical shield very pale brown, inconspicuous, on the front of which are 4 large black tubercles, and 4 smaller ones on the hind margin. Body cylindrical, skin shiny, appearing to be slightly wrinkled under a lens. Tubercles large, black, shiny, each bearing one bristle. Bristles long, stiff and black; tubercles i, iii and v in a line, iv close behind spiracles, which are small and black. Thoracic feet and prolegs concolorous with venter, plates on thoracic feet shiny black. The first two pairs of abdominal feet aborted.

On the 13th June the larvæ were quiet and swollen, ready for the first moult. At this time they were pallid. By the 14th nearly all had moulted.

Stage II.—Length, 5 mm. Head 0.6 mm. wide, round, slightly depressed and bilobed at vertex, greenish white, mottled with large and small blackish spots, the large spots at the base of each hair; ocelli dark; antennæ pale; tips of mandibles reddish. Cervical shield concolorous with body, and inconspicuous. Body above spiracles a dirty gray, some specimens greenish gray; ventral surface pale greenish. A pale whitish dorsal stripe is now apparent, also two whitish lateral stripes, one just below tubercle ii, the other just above tubercle iii. There is also a substigmatal band just below spiracles, touching tubercle iv. Tubercles as before, black, shiny, each bearing one black bristle. Skin of body smooth and shiny. Spiracles black, very small. Thoracic feet slightly darker than ventral surface and bearing blackish plates as before. Prolegs concolorous with venter; lower edge of claspers dark.

On the 15th June some were swollen and ready for the second moult. On the 16th nearly all moulted.

Stage III.—Length, 9.5 mm. Head 0.9 to 1.0 mm. wide, slightly depressed at apex, pale green, mottled or spotted as before, the large spots at base of each hair on face being black, and the smaller spots, which are mostly on the upper inner half of cheek, being brown; mandibles reddish; antennæ pale, darkened towards tips. Body cylindrical, dull greenish above spiracles, paler green beneath substigmatal band. In a few specimens the colour of the body above the spiracles is a dull reddish-brown. Dorsal and upper lateral stripes whitish. The lateral stripe apparent in last stage just above tubercle iii is very faint, but can be observed under a lens. The substigmatal band is a clear light

yellow, and is the most conspicuous marking on the body. The black tubercles are as before, but at the base of each there is a pale circle. Spiracles whitish, rimmed with black. Thoracic feet and prolegs concolorous with venter, thoracic feet darkened at tips. Claspers of prolegs slightly reddish; bristles pale and short.

On the 18th June a few larvæ passed the third moult, and on the 19th nearly all the remaining specimens moulted.

Stage IV.—Length 12.5 mm. Head 1.2 to 1.4 mm. wide, shaped as before, pale brown, finely mottled with darker brown, particularly on upper half of cheek; each hair on face encircled at base with black; antennæ and mandibles as before; ocelli dark. Body above spiracles dull brown with a greenish and a reddish tinge, below spiracles paler, namely, greenish brown with a reddish tinge. The colour of a few specimens above the spiracles is dull greenish, as in the case of the majority of specimens in last stage. Dorsal and upper lateral stripes whitish, distinct, edged with blackish brown; the lower lateral stripe just above tubercle iii very faint, as in Stage III. Substigmatal band very wide and conspicuous, of a bright light yellow colour, with a bright red stripe running through the lower half. Tubercles black, small, shiny, each with a pale circle at base, as in last stage; bristles very short and black. Spiracles yellowish, rimmed with black. Thoracic feet and prolegs pale, of a translucent appearance, all the feet spotted with black; bristles short.

On the 23rd June many of the larvæ passed the fourth moult, others a day or two following.

Stage V.—Length, 15 mm. Head 1.6 to 1.7 mm. wide, as in last stage, testaceous, mottled with darker brown. In this stage most of the larvæ are of an apple-green colour, only a very few being dull brown or reddish above spiracles; otherwise the larvæ are much the same as in the last stage. The pale lower lateral stripe just above tubercle iii has now disappeared, and the only stripes on the body are the dorsal and upper lateral (which afterwards will be mentioned as the lateral), and the wide, conspicuous substigmatal band. In the green larvæ the dorsal and lateral stripes are white, both bordered on each side with dark green, the dorsal stripe being the more heavily bordered. The substigmatal band is bright pale yellow, with no red on it. In the larvæ, which are reddish above spiracles, the substigmatal band is yellow, with some red on it, but not so much as in last stage. The dorsal and lateral stripes are not so white as

in the green specimens, and are bordered by dark brown. The ventral surface of all the specimens is slightly paler than the dorsal. Tubercles black and very small. Thoracic feet and prolegs concolorous with venter.

On the 27th June some of the specimens passed the fifth moult, the remainder on the 28th and 29th.

Stage VI.—Length 23 mm. Head 2.0 to 2.3 mm. wide, as before, testaceous, mottled and reticulated with dark brown. The larvæ in this stage are almost the same as in the last. Nearly half the specimens are brownish, some having a slight reddish shade, the venter being of a paler brown than the dorsum. The majority of the larvæ, however, are of an apple-green colour, with the venter slightly paler. The whole skin is spotted with white. Dorsal stripe heavily bordered on either side with blackish brown. Lateral stripe also bordered with the same colour, but not so heavily. Substigmatal band pale yellow, the lower half being brownish red. In the green specimens the dorsal and lateral stripes are not so conspicuous as in the dark larvæ, and are only faintly bordered with dark green, the substigmatal band being bright yellow, with no red in it whatever. The spiracles are white, lined with black, in both the brown and the green larvæ. Tubercles small, black bristles short. In the green specimens the cervical shield is concolorous with the body. In the dark specimens the shield is noticeable, being of a darker colour than the body. Thoracic feet and prolegs all concolorous with venter.

On the 30th June several larvæ passed the sixth moult, and by 3rd July nearly all had moulted.

Stage VII.—Length, 29 mm. Head 2.8 to 3.1 mm., as in last stage. The intensity of the colour of the head, as is natural in a caterpillar presenting such a wide range of colour variation, varies in different specimens, but, on the whole, becomes darker and the markings more distinct with each moult. The larvæ in this stage are of two colours as before. For a day or so after moulting, the dorsal and lateral stripes are very conspicuous. After a few days the lateral stripe is not so plain as at first, and in some specimens is interrupted. The dorsal stripe remains conspicuous, and has the appearance of a blackish band with a medio-dorsal line of pale yellow. The substigmatal band is very wide, pale bright yellow, many specimens, both green and brownish, having the lower half suffused with light red. This band is very conspicuous, and extends from the front edge of segment 2 right

down to the base of the anal feet. In the larvæ of both colours the venter is slightly lighter than the dorsum. Cervical shield slightly darker than body. In all the specimens the whole skin above the stigmatal band is densely mottled with minute black blotches and streaks. In some of the brown specimens the skin between the dorsal and lateral stripes, and lateral stripe and substigmatal band, has a decidedly reddish tinge, chiefly along the lower edge of the lateral stripe. In a very few specimens traces are evident of the lower lateral stripe which was plain in Stages II., III. and IV. Tubercles normal, very small, black, each on a small black spot; bristles short. Tubercle iv. is in a straight line close behind the centre of the spiracle. Spiracles yellowish, ringed with black. Thoracic feet and prolegs concolorous with venter; thoracic feet tipped with black. Tips of claspers of prolegs dark.

The mature larva is 37 mm. in length at rest, and 40 mm. when extended.

In the Report of the Dominion Entomologist, mentioned above, at page 237, the following general description of the full-grown larva is given:

"The general appearance of these caterpillars may be described as follows: The ground colour of the body, which varies remarkably in different specimens of the same brood, ranges from yellowish-green, through a dull yellow ochre, a ruddy brown, to a dark umber brown. The markings may be described as minute mottlings, dots and streaks aggregated on the dorsal area into a regular pattern consisting of a medio-dorsal continuous band, with a pale disconnected narrow line in the centre, and two lateral less-connected stripes also centred with a pale thread and of about the same intensity as the medio-dorsal band. The space between the lateral stripes is closely speckled with black dots. The stigmatal stripe is black, narrow and distinct, and close beneath it is a wide, conspicuous, yellow substigmatal band with the ground colour showing through it in places. The ventral surface is slightly paler than the dorsal. The head is honey yellow, mottled with darker markings."

It will be noticed that in the above extract the conspicuous dark shading above the substigmatal band has been given the value of a definite stripe, and referred to as the stigmatal stripe.

On the 6th July nine specimens buried, and the rest soon followed. A slight cocoon is formed apparently without any silk.

The pupa averages 17 mm. in length by 5.5 mm. in width; colour dark mahogany brown, polished. Thorax, wing-cases, etc., finely wrinkled with transverse lines; abdomen polished, the segments finely punctured at base. Cremaster stout, rugose above, excavated beneath, with two very short points about half way from base, one on each side, and at the tip two slender, divergent and capitate spines 0.4 mm. in length.

The first moth emerged on the 17th July, and others appeared during the following fortnight. About half the brood wintered over as pupæ, the first spring moth appearing on the 15th April (in a cool cellar). This was probably a month earlier than would have been the case out of doors.

Food-plants.—As the eggs from which these larvæ were reared were found on the European honeysuckle, leaves of this plant and many other shrubs were offered to them. The larvæ, however, avoided the honeysuckle, and the only plants eaten to any measure were the red oak, curled dock, willows and poplar. Of these, a note was made that the oak was decidedly the favourite food-plant. Later, however, the leaves of all woody-stemmed plants were refused, and plantain, dandelion and a few other low-growing herbs were fed to them, plantain being the most eaten.

NORTHWEST (CANADA) ENTOMOLOGICAL SOCIETY.

The fourth annual meeting of this Society will be held on Wednesday, November 5th, 1902, at 3 p. m., in the High School, Calgary, Alta. Among other things it is proposed to devise an extension of its work on the lines of a Natural History Society, and to that end to adopt as its title, "The Northwest Natural History Society," or a similar title. His Lordship the Bishop of Saskatchewan and Calgary will preside, and the Department of Agriculture will be represented. If this extension is carried out, the various objects will be entrusted to divisions of entomology, botany, ornithology, etc., with a central presiding officer at Regina.

TWO NEW ANTS'-NEST COCCIDS FROM TEXAS.

BY GEO. B. KING, LAWRENCE, MASS.

Dactylopius Wheeleri, n. sp.—♀ flesh colour, covered with a white, fluffy material, elongate oval, $1\frac{3}{4}$ mm. long, 1 broad, $\frac{1}{2}$ high, convex, very flat beneath. Segmentation distinct. Boiled in potash, they turn brown; transferred to cold water, the internal juice becomes colourless. Pressed under cover-glass, the skin is colourless, with several long hairs anteriorly and on the caudal region above the anal ring and caudal tubercles. Anal ring normal, with six stout bristles. Caudal tubercles very prominent, with two long bristles 120 and 260 μ long. Legs stout, front leg coxa 140. Femur and trochanter 220. Tibia 148. Tarsus 100 μ long. Claw thin, sharp, with a distinct tooth near the end. Tibia and tarsus have several short hairs. Digitules of tarsus and claw very small. Labium small. Rostral loop exceedingly long.

Antennæ 7-jointed: Joint (1) 48, (2) 52, (3) 52, (4) 44, (5) 40, (6) 40, (7) 100. Formula 7(23)14(56) of a finished mount in balsam. The same examples measured, while they were wet with alcohol under cover-glass, as follows: Joint (1) 40, (2) 60, (3) 44, (4) 44, (5) 44, (6) 44, (7) 104. Formula 72(3456)1. All the joints have several short hairs, excepting joint 7, which has two long hairs at the tip of that joint. Antennæ 216 μ apart. Eyes large, oval.

Hab.—Austin, Texas, in nests of *Camponotus maculatus*, var. *sansabeanus*, Buckley. Collected and sent to me for study by Prof. William M. Wheeler, of the University of Texas, who says the ants remove the coccids to their chambers when the nests are disturbed, and that they are very frequently met with. I have given the measurements of the several joints of the antennæ while wet and hardened in alcohol and a finished mount in balsam, for the purpose of calling attention to the variability of the antennal joints under each process. Owing to our large list of Coccidæ now described, it seems to the writer that all such changes should be recorded, so as to assist in every way possible the identification of the species if found in another locality or country. This is the first ant-nest coccid from Texas, and the first species of the genus *Camponotus* found in North America to harbour coccids in its nest.

Eriococcus Texanus, n. sp.—The females of this species received from Prof. Wheeler were in alcohol, and seemed to be flesh colour; when placed in liquid potash, they turn red-brown. "When alive, they are of a peculiar green colour" (Wheeler).

♀, examined with a hand lens, very much resembling a *Dactylopius* naked, i. e., without ovisac, distinctly segmented, oval, tapering behind, plump, $2\frac{1}{2}$ mm. long, $1\frac{3}{4}$ broad. Boiled in K. O. H., the derm is tinged with yellow, with spines of the normal type and confined to sides, short, $20\ \mu$ long, those of the outer margin twice as long; several spine-like long hairs of two sizes are found scattered irregularly over the body, $28 \times 60\ \mu$ long, and some round gland-pits. Antennæ, legs and mouth-parts light brown. Antennæ 6-jointed: Joints (1) 40, (2) 40, (3) 112, (4) 28, (5) 28, (6) $40\ \mu$ long.

Legs long and stout.

Front leg coxa, 120. Femur and trochanter 200. Tibia 120. Tarsus 132.

Middle " 120. " " " 216. " 120. " 133.

Hind " 180. " " " 220. " 140. " 180.

Claws $6\ \mu$ long, stout, curved and thin towards the end. Digitules of tarsus filiform, with small knobbed ends. Anal ring normal, with 8 bristles, which are thin, $100\ \mu$ long. Posterior tubercles large and rounded, about $80\ \mu$ long and broad, with one long bristle and four stout spines $24\ \mu$ long.

Hab.—San Angelo, Texas, on roots or young shoots in the earthen nests of *Cremastogaster punctulata*, Emery. "They were undoubtedly being cultivated by the ants" (Wheeler). Collected by Prof. Wheeler, March, 1902. Its nearest North American ally is *Eriococcus Tinsleyi*, Ckll., which has in the hind leg a very long tarsus as in *E. Texanus*, but differs very materially in other respects; in the antennæ a general type of *E. Palmeri*, Ckll., but in *Texanus* joint 3 is very much longer than in *Palmeri*.

This is the first species of the genus *Eriococcus* known to inhabit ants' nests. The absence of an ovisac in this species is no doubt due to the habit of the ants lapping the bodies of the coccids, and thus preventing a sac from forming. In a recent letter from Prof. Cockerell, he says: "If this really has no ovisac, even when producing eggs, it is not an *Eriococcus*, but a *Rhizococcus*. Such forms occur in Australia, and Signoret recorded one from Europe. *Rhizococcus* is to *Eriococcus* as *Calymnatus* is to *Pulvinaria*."

CLASSIFICATION OF THE FOSSORIAL, PREDACEOUS AND
PARASITIC WASPS, OR THE SUPERFAMILY
VESPOIDEA.

BY WILLIAM H. ASHMEAD, A. M., ASSISTANT CURATOR, DIVISION OF INSECTS,
U. S. NATIONAL MUSEUM.

(Paper No. 10.—Continued from p. 273.)

SUBFAMILY II.—Emboleminæ.

The globose or rounded head, which is never flat, oblong, and the difference in the antennæ, the antennæ in males being 10-jointed, in the females 13-jointed, readily separate the subfamily from the Bethylinæ. The group comes quite close to the Dryininæ, but in the latter the head is transverse or subquadrate, never rounded, while the antennæ are 10-jointed in both sexes

The genus *Olixon*, Cameron, originally described as a Braconid, belongs here, without much doubt, I think, judging from the description and the figure. Cameron says: "I am unable to point out the natural position of this curious genus. The elongated fore legs give it a look of a Bethyloid, to which, indeed, it bears a general resemblance; but I feel inclined to regard it as a true Braconid." I have not seen a specimen of this genus, but Mr. Cameron's figure and description clearly show that it belongs here; the thickened fore femora are characteristic of the group.

Table of Genera.

1. Males: antennæ 10-jointed.....4.
Females: antennæ 13-jointed.
Wingless or subapterous forms.....2.
Winged forms.....3.
2. Scape much shorter than the first joint of the flagellum; form elongate; head long, oval, wider than the transverse pronotum; ocelli wanting; eyes prominent, placed high up on the sides of the head and extending forward to hardly half the length of the head; antennæ long, slender, inserted anteriorly *below* a line drawn from the base of the eyes; first joint of flagellum the longest... (1) *Olixon*, Cameron.
(Type *O. testaceus*, Cam.)
Scape much longer than the first joint of the flagellum; form less elongate; head rounded, with a frontal tubercle; ocelli very minute or wanting; eyes rounded, not prominent... (2) *Pedinomma*, Förster.
(Type *Myrmecomorpha rufescens*, Westw.)

3. Eyes arched; ocelli large; scape shorter than the first joint of the flagellum..... (3) *Embolemus*, Westwood.
(Type *E. Ruddii*, Westw.)
4. Pronotum shorter than the mesonotum, *without* a median sulcus; scape much shorter than the first joint of the flagellum; stigma in the front wings three or more times longer than thick..... (3) *Embolemus*, Westwood.
Pronotum as long as the mesonotum, *with* a deep median sulcus; scape much longer than the first joint of the flagellum; stigma in front wings not twice as long as thick..... (4) *Ampulicomorpha*, Ashmead.
(Type *A. confusa*, Ashm.)

SUBFAMILY III.—*Dryininæ*.

This natural group is easily recognized by the antennæ, which are 10-jointed in both sexes, and by the shape of the head, which is quite different in shape from that in the *Bethylinæ* and the *Emboleminæ*.

The species in their habits and development also differ from the others, all of them being parasitic upon the nymphs of various Rhynchota, belonging to the suborder Homoptera, the families Fulgoridæ, Cercopidæ, Membracidæ and Jassidæ being especially subject to their attacks.

Table of Genera.

1. Males.....7.
Females.
Vertex convex, *not* impressed.....3.
Vertex deeply impressed or concave; anterior feet chelate...2.
2. Wingless, *without* a scutellum.....(1) *Gonatopus*, Ljungh.
(Type *G. pedestris*, Ljungh.)
Winged, with a scutellum.....(2) *Dryinus*, Latreille.
(Type *D. formicarius*, Latr.)
3. Front wings with an oval or ovate stigma.....4.
Front wings with a narrow or lanceolate stigma; front feet chelate.
Pronotum not quite as long as the mesonotum, much contracted; fourth joint of front tarsi not much longer than the third, the first twice as long as the three following united; maxillary palpi 4-jointed.....(3) *Bocchus*, Ashmead.
(Type *B. flavicollis*, Ashm.)
4. Front tarsi not chelate.....6.
Front tarsi chelate.....5.

5. Pronotum almost as long as the mesonotum ; fourth joint of front tarsi much longer than the third, the first *not* or scarcely longer than the three following united ; maxillary palpi 5-jointed..... (5) Chelogynus, Haliday.
(Type C. fuscicornis, Hal.)
- Pronotum much shorter than the mesonotum ; fourth joint of front tarsi scarcely longer than the third, the first *not* longer than the three following united ; maxillary palpi 4-jointed..... (6) Anteon, Jurine.
(Type A. jurineanus, Latr.)
6. Pronotum much longer than the mesonotum, the latter *without* a trace of furrows ; head large, broad..... (7) Mystrophorus, Förster.
(Type M. formicæformis, Ruthe.)
- Pronotum not or only slightly visible from above ; mesonotum well developed *with* furrows..... (8) Aphelopus, Dalman.
(Type A. melaleucus, Dalm.)
7. Front wings with an oval or ovate stigma..... 8.
Front wings with a narrow or lanceolate stigma.
Occiput deeply concave ; vertex and neck separated by a sharp angle ; mesonotum usually with distinct furrows ; front wings with a discoidal cell ; maxillary palpi 4-jointed..... (1) Gonatopus, Ljungh.
= Labeo, Haliday.
Occiput not deeply concave, straight and broad ; front wings without a discoidal cell ; maxillary palpi 5-jointed..... (4) Phorbas, Ashmead.
(Type P. laticeps, Ashm.)
8. Pronotum always much shorter than the mesonotum, sometimes hardly visible from above..... 9.
Pronotum much longer than the mesonotum.
Mesonotum *with* furrows ; maxillary palpi 5-jointed..... (5) Chelogynus, Haliday.
Mesonotum *without* furrows ; maxillary palpi 4-jointed..... (7) Mystrophorus, Förster.
9. Pronotum distinct ; mesonotum with or without a trace of the furrows ; maxillary palpi 4-jointed..... (6) Anteon, Jurine.

Pronotum not or scarcely visible from above, more or less hidden by the front margin of the mesonotum, which is strongly developed, the furrows on the latter distinct; maxillary palpi 5-jointed.....(8) *Aphelopus*, Dalman.

FAMILY XXXIII.—Trigonalidæ.

This family, on account of its anomalous character, is one of the most interesting in the superfamily Vespoidea. The species are extremely rare, although widely distributed, and only four genera are known.

The family is usually associated with the Evaniidæ and the Ichneumonidæ, in my opinion an unnatural position for it.

Prof. Westwood, however, evidently had a true appreciation of the affinities of his genus *Trigonalys*, the type of the family, for when he described it, in 1835, he observes: "*Genus anomalum familiæ dubiæ caput et antennæ Lydæ, abdomen Mutillæ. Alarum nervi ut in Myrmosa dispositi.*" Again, five years later, in his Introduction Mod. Classif. Insects, Vol. II., p. 215, he wrote: "I may here mention another anomalous genus, which I have described under the name *Trigonalys*, having somewhat of the aspect of a male *Mutilla*, but with the head flattened and the antennæ longer, very slender at the tips, and composed of 23 or 24 joints, very like those of *Lydæ*; the legs are simple and the abdomen punctured. The veins of the wings are nearly as in *Myrmosa* and *Mutilla Europæa* male."

The responsibility for the removal of *Trigonalys* to the Terebrant Hymenoptera appears to be due to Shuckard, an able British Hymenopterologist, who, in 1851, deceived by the anomalous character of the antennæ and the two-jointed trochanters, incorrectly associated it with *Aulacus*, Jurine, into a family to which he gave the name *Aulacidæ*, placing the family next to the Evaniidæ.

Mr. Cresson, in his Synopsis of the North American Hymenoptera, published in 1888, properly established the family Trigonalidæ, but has incorrectly placed it between the families Evaniidæ and Ichneumonidæ.

The Trigonalidæ, in my opinion, have nothing to do with the Evaniidæ or the Ichneumonidæ; they are far removed and widely separated by many salient characters, and represent a natural group in the superfamily Vespoidea. Their affinities, to me, seem to be clearly with the Bethyloidæ,

Sapygidæ, Myrmosidæ and Mutillidæ ; they also agree with the three last-mentioned families in habits, since species of *Trigonalys* have been bred from the nests of wasps (*Vespa* and *Polistes*). It is probable also that, like the Mutillidæ, they will be found to live parasitically in the nests of some of the bees.

Table of Genera.

1. Second cubital cell triangular or petiolate, the first recurrent nervure not interstitial, joining the cubitus before the first transverse cubitus; anterior margin of clypeus truncate or slightly rounded, never emarginate ; second ventral segment in ♂ normal..... 2.

Second cubital cell not petiolate, the first recurrent nervure interstitial with the first transverse cubitus ; second recurrent nervure joining the third cubital cell at or a little *before* the middle ; anterior margin of clypeus more or less emarginate medially ; second ventral segment in ♂ produced at apex medially into a tooth or process (1) *Lycogaster*, Shuckard.
(Type *L. pullatus*, Shuck.)

2. Front wings with *three* cubital cells, the marginal cell not attaining the apex of the wing..... 3.
- Front wings with *four* cubital cells, the marginal cell attaining the apex of the wing.

Legs not short, rather slender, not robust, the tarsi slender, the basal joint elongate, joints 2-4 much longer than wide ; antennæ more than 16-jointed, tapering off toward tips..... (2) *Trigonalys*, Westwood.
(Type *T. melanoleucus*, Westw.)

Legs short, robust, the tarsi stout, the first joint hardly thrice as long as thick ; joints 2-4 transverse ; antennæ 16-jointed..... (3) *Nomadina*, Westwood.
(Type *N. Smithii*, Westw.)

3. Second cubital cell receiving the second recurrent nervure..... (4) *Liaba*, Cameron.
(Type *L. balteata*, Cam.)

THREE NEW SPECIES OF CULEX.

BY D. W. COQUILLET, WASHINGTON, D. C.

Culex atropalpus, new species.

♀. Black, the halteres, apices of coxæ, and bases and under side of femora, except toward the apex, yellowish white; scales of palpi black, occiput covered with broad, appressed whitish scales and with a patch of black ones near the middle of each side, the middle of the upper side covered with narrow yellowish scales, the upright forked scales yellow; scales of mesonotum golden yellow and with a median vitta of black ones; scales of abdomen purplish black, and with a narrow fascia of whitish ones at the bases of the segments, becoming much broader on the venter; scales of legs black, those at base and on under side of femora, except toward the apex, also at extreme apices of femora, both ends of tibiæ and of the tarsal joints, except the last two and apex of the third on the front and middle tarsi, white, those on last joint of hind tarsi wholly white; claws of front and middle tarsi toothed, those of the hind ones simple; wings hyaline, lateral scales of the veins long and narrow, first submarginal cell slightly over twice as long as its petiole.

♂. Colouring as in the female, except that the short joints of the antennæ are ringed with white; palpi two-thirds as long as the proboscis, slender, the apex blunt, last two joints less than half as long as the remaining portion, and bearing a few rather short hairs; claspers of nearly an equal thickness, evenly covered with hairs, and with a long, slender, curved claw at apex of each; fourth joint of front and middle tarsi as broad as long; larger claw of front and middle tarsi one-toothed, the smaller one and the claws of the hind tarsi simple.

Length, 3.5 to 4.5 mm. Thirty-seven females and three males. Type No. 6558, U. S. National Museum.

Habitat.—Richmond, Va. (Sept. 26: E. G. Williams); Plummer's Isd., Montgomery Co., Md. (May 18 to Aug. 14: R. P. Currie and H. S. Barber); Shenk's Ferry, Pa. (Oct. 21: S. E. Weber), and White Mts., N. H. (H. K. Morrison).

Near *Canadensis*, but readily distinguished by the colour of the scales on the palpi and mesonotum.

Culex varipalpus, new species.

♀. Same as *atropalpus*, with these exceptions: Scales on apices of palpi and a ring near the middle, white; occiput with two patches of

black ones on each side, the upright forked ones black and whitish ; first submarginal cell noticeably less than twice as long as its petiole.

Length, 3 mm. A female specimen collected July 29 by Mr. H. S. Barber. Type No. 6559, U. S. N. M.

Habitat.—Williams, Arizona.

Culex quadrivittatus, new species.

♀. Differs from *atropalpus* as follows : Scales at apices of palpi and several on the upper side white, scales of occiput yellowish and with four patches of black ones ; scales of mesonotum black and with four vittæ, and lateral margin of golden yellow ones ; abdomen black scaled, each segment with a lateral patch of white ones extending nearly to the middle of the venter ; scales of legs at apices of tibiæ and of joints of tarsi black, on the last two joints of the hind tarsi wholly black, tarsal claws simple.

Length, 4.5 mm. Eight females received, June 13, by Dr. L. O. Howard from Prof. Gustav Eisen, of San Francisco, Cal. Type No. 6560, U. S. N. M.

Habitat.—Chacula, Guatemala (6,600 feet altitude).

A NEW MYODITES (RHIPIPHORIDÆ).

BY W. DWIGHT PIERCE, LINCOLN, NEBR.

The specimens on which this description is based are in the collections of the University of Nebraska and of the author. I owe especial acknowledgments to Mr. J. C. Crawford, Jr., for specimens and field observations, and to Professor Bruner for directing my work. A sixteen-power glass was used in determining characters.

Myodites solidaginis, n. sp.—Female : Length, 7.9 mm. Head depressed, finely and evenly punctate, clad with dense yellowish-white, perpendicular pubescence. ; antennæ pectinate, ten-jointed, pubescent, very finely punctate, third joint with base of tooth yellowish ; vertex between antennæ elevated ; mandibles with the exterior side finely punctate, densely pubescent, grooved, in front and on interior sides shining glabrous. Thorax densely punctate, with median groove, but becoming mesially carinate behind the centre, clad with dense, upright, yellowish-white pubescence. Scutellum very finely and densely punctate, pubescent ; postscutellum shining glabrous ; metathorax bilobed, densely pubescent, punctate ; first dorsal segment of abdomen glabrous, remaining dorsal segments punctate, pubescent ; thorax and abdomen below, pygidium and legs punctate, pubescent ; elytra irregularly punctate,

slightly pubescent; posterior tarsi with first joint large, elevated, obliquely truncate and emarginate at tip, more than twice as long as second and much thicker, second joint longer than the third; claws pectinate; anterior and median tibiæ with the first joint longer than the three following joints.

Colour: Antennæ with the exceptions above mentioned, head, thorax, pygidium, genital sheath, femora, first ventral segment, transverse band on the first dorsal and lateral segments, two spots on second ventral, and median spots on the last four dorsal segments, black; abdomen, with the above exceptions, red; elytra honey-yellow; wings transparent honey-yellow, with a large fuscous cloud on the costal margin toward apex; tarsi and tibiæ varying from black to yellow. The ♀ abdomen varies from red to brownish.

Male: Length, 7-9 mm. Similar to the female, with the following exceptions: Antennæ double flabellate, 11-jointed, finely punctate throughout, pale yellow, tipped with dark; abdomen dark, with joints of first three dorsal segments yellowish, membranous. Legs yellow, with black spot at junction of femora and tibiæ.

This species differs from *Popenoi*, *semiflavus* and *scaber* by having the abdomen red in the ♀ and black in the ♂. From the first two it differs by having the prothorax black, punctate, densely pubescent, vertex pubescent; from *Popenoi* by having the first joint of posterior tarsi more than one-half longer than second; from *scaber* by having the first joint much thicker than the second.

A large series of females was caught by the author on August 24, 25, 26, 1901, and by Mr. Cary on August 26, on flowers of *Solidago Missouriensis*, *rigida* and *Canadensis*, at Lincoln, Nebr. A large number were also taken August 21, 1902, and during the following week. These were, as a general rule, ovipositing in the buds of *Solidago rigida*, while a few were on the flowers of *Solidago Missouriensis*. The distribution was limited to the regions near the salt basins.

A large swarm of males was caught flying in the region of colony of *Epinomia triangulifera*, Vachal, *Perdita albipennis*, and certain species of *Andrena* and *Nomada*, on August 25, 1901, by Mr. Crawford, on the salt basins at Lincoln. Two males were caught on *Solidago* by the author; also two pairs on August 26 and 27, 1901.

A ♂, taken from the Pine Ridge, in Northwestern Nebraska, during July, has the antennæ orange coloured, the clouding of the elytra fulvous, and is slightly smaller. This may be a different species.

TWO NEW SPECIES OF LEPIDOPTERA.

BY A. RADCLIFFE GROTE, HILDESHEIM, GERMANY.

Peridroma canities, n. sp.—Form and markings of the Texan *P. annexa*, but of a different, dusty gray, colour and a little shorter winged. Primaries dusty gray, with a slight dusky shading along costa, against which the pale dots, marking inception of transverse lines, are relieved. T. p. line tolerably distinct, indentate interspaceally, with included pale shade. Veins marked with fuscous. T. a. line double, with a strong outward inflection above internal margin. Claviform blunt, filled in with fuscous. Orbicular with central dot. Reniform moderate, filled in with fuscous. Cell slightly darker shaded. Markings inconspicuous, concolorous. Hind wings (♀) white.

Received with *P. massium*, Guen., from G. Schimpf, Buenos Ayres. I am indebted to Sir George Hampson for determinations. The present species is unnamed in the British Museum. The thoracic markings are faint; collar dusky, abdomen paler, with faint dorsal shade. According to Tutt, *saucia* is the type of *Peridroma*, Hb. (see Grote, List, etc., 20).

Loxostege triumphalis, n. sp.—Apparently allied to *annaphilalis*, Grote, but a smaller insect (20 mm.), and without the brown spot on primaries and the black line on the orange hind wings (see CAN. ENT., XIII., 34). The species has the same false air of an *Annaphila*, owing to the colours. Fore wings blackish, with a sprinkling of bone-coloured or white scales, somewhat lustrous. Reniform a black cloud. Transverse lines obsolete. A discontinuous series of black antemarginal dots. Fringes blackish, intermixed with whitish scales. Hind wings pure dull orange, with neatly defined blackish fringes, and a blackish shading at base; beneath both wings orange like hind wings above; a black mark on fore wings in place of reniform. Costa of primaries marked with black before apices, which latter show a blackish shading. Body above and appendages black or blackish like primaries, the abdominal segments vaguely defined by scattered pale scales; beneath, with under side of palpi, orbits of the eyes, legs, more or less white or whitish. The clypeal prominence is feeble.

Two male specimens of *L. triumphalis* were sent me from San Luis Obispo, California, by Mr. Geo. Franck. So far as the literature is accessible to me, I find no description of the species. One specimen is unset.

ENTOMOLOGICAL SOCIETY OF ONTARIO.

The thirty-ninth annual meeting of the Society was held in London on the 29th and 30th of October. A business meeting of the Council was held during the first morning. In the afternoon a conference on the pea weevil in Ontario took place. Dr. Fletcher gave an account of the spread of this insect and the injury and loss it had caused; the pea crop of this Province he considered to be one of the most valuable products of the country, and yet it was rapidly being reduced by the weevil to such an extent that no less than seventy thousand acres had been withdrawn from this crop during the last ten years, involving an annual loss to the community of about five millions of dollars. The policy of abandoning its cultivation for two or three years was advocated in some quarters, but this he believed to be entirely unnecessary, as there was a cheap, easy and effective remedy available. If the pea-growers would harvest and thresh their crop at as early a date as possible, and then fumigate the stored peas with bisulphide of carbon, there would be no difficulty in getting rid of the pest. The important point is how to prevail upon the farmers to adopt this method of controlling the insect. In the discussion which followed, and which was participated in by Prof. Lochhead, Mr. Fisher, Dr. Bethune, Mr. Pearce, and Prof. James, it was suggested that the Superintendent of the Farmers' Institutes of Ontario should have the matter brought before all the meetings during the coming winter, that information regarding the insect and the remedial measures to be employed should be disseminated as widely as possible, and that the Government of Ontario should be requested to send a competent staff of men to the rural sections of the country, whose duty it should be to show the farmers practically how these remedies can most easily and successfully be carried out. Resolutions in accordance with these suggestions were unanimously adopted.

Mr. George Fisher, the Provincial Inspector of Scale insects, gave a report upon the insects of the year in the Niagara and Hamilton districts, and referred especially to the San José scale. He gave a detailed description of the methods employed in treating fruit trees with the lime and sulphur wash, which he has now proved to be a thoroughly effective remedy for the scale. Dr. Fletcher stated that he had just returned from visiting the scene of Mr. Fisher's operations, and could bear the highest testimony to their complete success. At the close of the discussion, which included the chemical composition of the wash as well as the mode of preparing and applying it, a resolution was adopted congratulating the

Minister of Agriculture for Ontario and his assistants on the excellent results which had been achieved by their efforts, and the important discovery of a practicable and effective remedy for this most destructive insect.

In the evening a public meeting was held at the Normal School, at which Prof. James, Deputy Minister of Agriculture for Ontario, presided. The Rev. Dr. Fyles read his presidential address on "Insect Life," illustrated by a series of beautiful coloured diagrams which he had himself prepared. Prof. Lochhead followed with a lecture on "Some noted Butterfly-hunters and some common Butterflies," which he illustrated with a large series of lantern pictures.

On Thursday, Oct. 30th, the reports of the Council, Directors, Officers, Branches and Sections were read, and also a number of valuable and interesting papers; these will all be published in full in the Annual Report to the Legislature. Many rare and interesting specimens were exhibited, and a considerable number were kindly presented to the Society's collections. The election of officers resulted as follows:

President—Professor William Lochhead, Ontario Agricultural College, Guelph.

Vice-President—J. D. Evans, C. E., Trenton.

Secretary—W. E. Saunders, London.

Treasurer—J. H. Bowman, London.

Directors: Division No. 1—C. H. Young, Hurdman's Bridge.

Division No. 2—C. E. Grant, Orillia.

Division No. 3—E. M. Walker, Toronto.

Division No. 4—G. E. Fisher, Freeman.

Division No. 5—J. A. Balkwill, London.

Directors Ex-officio (ex-Presidents of the Society)—Professor Wm. Saunders, LL.D., F.R.S.C., F.L.S., Director of the Experimental Farms, Ottawa; Rev. C. J. S. Bethune, M.A., D.C.L., F.R.S.C., London; James Fletcher, LL.D., F.R.S.C., F.L.S., Entomologist and Botanist of the Experimental Farms, Ottawa; W. H. Harrington, F.R.S.C., Ottawa; John Dearnass, Normal School, London; Henry H. Lyman, M.A., F.R.G.S., F.E.S., Montreal; Rev. T. W. Fyles, D.C.L., F.L.S., South Quebec.

Librarian and Curator—J. Alston Moffat, London.

Auditors—W. H. Hamilton and S. B. McCreedy, London.

Editor of the Canadian Entomologist—Rev. Dr. Bethune, London.

Editing Committee—Dr. J. Fletcher, Ottawa; H. H. Lyman, Montreal;

J. D. Evans, Trenton ; W. H. Harrington, Ottawa ; Professor Lochhead, Guelph.

Delegate to the Royal Society—Rev. Dr. Bethune, London.

Delegates to the Western Fair—J. A. Balkwill and W. E. Saunders, London.

Committee on Field Days—The Chairmen of the Sections and Dr. Woolverton, Messrs. Balkwill, Bowman, Law, Moffat, Rennie, and Saunders, London.

Library and Rooms Committee—Messrs. Balkwill, Bethune, Bowman, Dearness, Moffat, and Saunders, London.

REMARKS ON THE THIRD VOLUME OF TUTT'S BRITISH LEPIDOPTERA.

BY HARRISON G. DYAR, WASHINGTON, D. C.

The third volume of Mr. J. W. Tutt's "A Natural History of the British Lepidoptera," etc., is marked by the same care and fullness of detail as the previous volumes. The detail with which the subject is treated appears in the fact that this volume of 540 pages treats of but 14 species of moths. It is a veritable storehouse of information.

Mr. Tutt has quoted my views on the larval characters in several places, and has raised certain questions in this connection on which I wish to remark.

For some unexplained reason, Mr. Tutt refuses to accept the homology of the primary setæ of the Sphingidæ as being the same as that of other Lepidoptera (pages 233 note, 359, 364 note, 365, 367 and 499). He states that tubercle v is absent, and there is an additional tubercle before the spiracle, which is not v moved up, but something new. I cannot imagine any reason sufficient to account for such a radical supposition. How remarkable such a structure would be Mr. Tutt himself does not seem to appreciate. If it were so, it would almost remove the Sphingidæ from the Lepidoptera ; for if there is one thing constant in Lepidopterous larvæ, it is the five upper primary setæ, which are absolutely uniform, not only in the Lepidoptera, but in other allied lower forms, such as the Mecoptera. The number of these setæ may be increased by the addition of secondary ones, and they may be obscured by specializations, but a subtraction from their number may

not occur. In the more generalized larvæ, tubercles iv and v occur side by side, in line, neither one higher than the other. In certain Tineids this position begins to fluctuate, in some iv being a little higher than v, in others v a little higher than iv. In the Bombycid phylum (culminating in Noctuidæ and Arctiidæ), the tendency of iv to be elevated is emphasized, and it rises as high as the top of the spiracle, or even a little above it, on certain segments of some Noctuidæ, while v remains in its original subventral position. Mr. Tutt accepts this interpretation, and does not feel called upon to invent hypothetical setæ to account for the change in position of tubercle iv. Now, in the Sphingidæ the tendency of v to be elevated is emphasized, while iv remains in the original subventral position. The dorsad movement of v in the Sphingidæ is not greater, not so great, in fact, as that of iv in the Bombycid phylum, yet here Mr. Tutt finds a difficulty, and wishes to regard v as absent and represented by a new seta. This seems to me a gratuitous assumption, intrinsically improbable, and contradicted by the very palpable homology of the primary Lepidopterous setæ. Mr. Tutt would homologize "the so-called" tubercle v of the Sphingidæ (page 367) with "the prespiracular wart of the Lachneids." This wart is secondary, as shown by my figure of *Tolyte* (Proc. Bost. Soc. Nat. Hist., XXVII., 144, 1896) and *Mala-cosoma* (Psyche, VII., 259, 1895), but it is accompanied by other secondary structures, while the primary tubercles are all accounted for. He can hardly really mean this, as he does not draw the obvious inference of a close relation between the Sphingidæ and Lachneidæ.

Mr. Tutt's references to the Lachneid tubercles are far from clear. He says that in *Pachygastria trifolii* (p. 23), "iv and v form a subspiracular, many-haired wart," and of *Lasiocampa quercus* (p. 60), "iv + v almost postspiracular." This would imply a union of tubercle iv and v, which I have never observed in the Lasiocampid phylum. These tubercles remain separate, but become reduced, while the large lappet is formed from tubercle vi. It is unfortunate that Mr. Tutt did not bring out clearly the complicated but pretty homology of the Lachneid warts. Figures would have been useful here.

Finally, a word on the relationship of *Dimorpha* (*Endromis*) and *Chelepteryx* (p. 230). My own view is that these forms are nearly related, though I have not the material to prove the point. It is true that the mature larvæ look very unlike, one being a smooth Sphinx, the other a big, hairy Lasiocampid. But these characters are only

special adaptations. In the first stage, *Dimorpha* has many-haired warts, as shown by my figure in Grote's "Die Saturniiden." I have re-examined the material, and have no correction to make to the figure. Tubercle vi is clearly absent, while i to v are converted into warts, ii smaller than i, iv and v nearly in line, iv only a little dorsad. On the thorax there are two warts above the stigmatal wart. I do not find tubercle iib; if present, it must be a small rudiment (the larvæ are very difficult to examine from their opaque black colour). The arrangement suggests the Lachneid phylum, though the subprimary tubercles are strangely absent, but it does not suggest the Lachneidæ nor Liparidæ proper, on account of the presence of but two upper warts on the thorax. It is, however, nearly paralleled by the first stage of *Bombyx mori*, in which the lower of the three thoracic warts (iib) is reduced to a single small hair; but here the subprimary tubercles are present. *Bombyx* also resembles *Dimorpha* in the loss of the tubercles after the first stage and the development of a "caudal horn." Without specimens of *Chelepteryx* larva, and especially of stage I, it is difficult to get far in comparison with *Dimorpha*. Scott's figure shows a big Lachneid-like larva, with proportionately small, many-haired warts. Wart ii appears absent, corresponding with its extreme reduction in *Dimorpha*, but there are two subdorsal warts in line on the thorax, as in the Lachneid phylum, while warts i on joint 12 are separate. The lateral warts are not shown in the figure, but according to the description there is only one wart to represent iv and v, while vi is present. Someone in Australia ought to give us a full account of *Chelepteryx*.

Mr. Tutt (p. 272 note) queries what I intended by the primitive first stage in *Aglia*, stating that it seems specialized to him. Further on (p. 286 note) he says: "We do not agree that *Aglia* has a primitive first stage." By the primitive first stage I mean that condition in which only the primary setæ are present, unmodified, not converted into warts, and without the addition of any secondary setæ. This condition obtains in *Aglia*, therefore it has a primitive first stage. I do not consider in this definition other specializations of the larva, the hypertrophy of the tubercles, etc. They may be present or not. If present, they naturally constitute a specialization, as Mr. Tutt remarks, but I have not regard to these in this connection.

On page 364, Mr. Tutt states that I consider the Sphingids, Notodonts and Lachneids related on larval characters, and he designates

this as an "impossible combination." In this designation he is perfectly right; but I never held the view attributed to me. I pointed out an analogy in the development of a process on the eighth abdominal segment in the larvæ of these families, but I never intended to imply any homology between them, and I do not think that my article, referred to by Mr. Tutt, reads in this way.

THE HYMENOPTEROUS PARASITES OF PHENACOCOCCUS CAVALLIÆ, CKLL.

BY WILLIAM H. ASHMEAD, WASHINGTON, D. C.

About the first of October, Prof. T. D. A. Cockerell sent me for names several parasites bred by him from a Coccid, *Phenacoccus cavalliæ*, Ckll., collected at Roswell, New Mexico. In the lot were *four* distinct species of Chalcids, two being new, but one of these is a hyperparasite, as follows: (1) *Blepyrus phenacocci*, sp. nov.; (2) *Cheiloneurus dactylopii*, How.; (3) *Signiphora dactylopii*, Ashm.; and (4) *Tetrastichus blepyri*, sp. nov. The new species are described below:

Blepyrus phenacocci, sp. n.—♀. Length, 1.3 to 1.4 mm. Stature and general appearance similar to *B. mexicanus*, How. Aeneous black, the thimble-like punctuation of the head more or less metallic greenish; antennæ, except the pedicel and the club, all tarsi, and the extreme tips of middle and hind tibiæ, honey-yellow; the pedicel is obconical, about thrice as long as thick at apex, brown-black; the funicle is 6-jointed, the joints transverse, gradually widening to the club, the latter being large, stout and black. Wings hyaline, the tegulæ black, the veins dark brown, the marginal vein very short, hardly twice as long as thick, the post-marginal and stigmal veins long, about equal.

♂. Length, 1 mm. Agrees well with the female, except in colour and structure of the antennæ: the antennæ are wholly black, except the scape narrowly at the extreme apex and beneath towards apex, the pedicel being much shorter, only a little longer than thick, while the flagellum is filiform, clothed with a short pubescence, the joints longer than thick.

Type.—Cat. No. 6604, U. S. N. M.

Hab.—New Mexico: Roswell.

Host.—Rhynch.: *Phenacoccus cavalliæ*, Ckll.

- Tetrastichus blepyri*, sp. nov.—♀. Length, 0.8 mm. Black, shining, impunctate, except some punctures in the parapsidal furrows; in one specimen the mesonotum is blue-black; the middle grooved line on the mesonotum is nearly obsolete, wanting posteriorly; metanotum smooth, with a median carina; the scape, the extreme apex of the pedicel, the tegulæ, the apices of the femora, and all tibiæ and tarsi, are yellowish white. Wings hyaline, the veins light brown. The abdomen is ovate, depressed, and very little longer than the head and thorax united.

Type.—Cat. No. 6605, U. S. N. M.

Hab.—New Mexico: Roswell.

Host.—Hym.: *Blepyrus phenacocci*.

XANTHOENCYRTUS, gen. nov.

This new genus, on account of the very short marginal vein and the arrangement of the ocelli, comes near to *Psyllæphagus*, Ashm. The two genera may, however, be separated as follows:

Lateral ocelli not close to the eye margin.

Yellow; pedicel more than twice as long as the first funicle joint; all funicle joints wider than long; club rather large,

stout.....*Xanthoencyrtus*, gen. nov.

Aeneous black or metallic; pedicel not twice as long as the first funicle joint; not all the funicle joints wider than long; club neither so large nor so stout.....*Psyllæphagus*, Ashm.

Xanthoencyrtus nigroclavatus, sp. n.—♀. Length, 1.6 mm. Yellow; the legs and the sutures of the abdomen yellowish white; eyes and club of antennæ brown-black; scape above more or less, the pedicel basally and the first four joints of the funicle light brownish, the tip of the pedicel and the fifth and sixth funicle joints yellowish white. Wings hyaline, finely pubescent, but with an oblique hairless line from the marginal vein; the marginal and postmarginal veins are punctiform, while the stigmal vein is moderately long, with a slight upward curve.

Type.—Cat. No. 6606, U. S. N. M.

Hab.—Indiana; Princeton (Prof. F. M. Webster).

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EDITED BY

REV. C. J. S. BETHUNE,

LONDON, ONTARIO.

DECEMBER, 1902.

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1902.

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The advertiser is now collecting in the above Island, and would be glad to hear from any one requiring perfect entomological specimens, of any order, at very reasonable prices. Address :

H. D. CHIPMAN, Port of Spain, Trinidad, Br. W. I

EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

CATOCALA ANDROMACHE will be supplied in exchange, to a few of the larger collections while my duplicates last. O. C. POLING, Quincy, Illinois.

WANTED.—North American *Geometridæ*, eastern and southern species (many of the commonest). Offered: Lepidoptera, Coleoptera and Hemiptera, named, from British Columbia. GEO. W. TAYLOR, Wellington, B. C.

LEPIDOPTERA.—I desire to exchange with collectors in all parts of N. A., particularly N.-W. and S.-W. JOHN L. HEALY, 1137 Pratt Ave., Chicago, Illinois.

LEPIDOPTERA.—Would like *Parnassius* of the world, except *Apollo* and *Sminthens*. Also good N. American Lepidoptera. Have to offer: *Chion. Brucei* and *oeno*, *Erebina magdalena* and *callias*, *Colias Scudderi*, *melitæa*, *Brucei*, *minuta* and *ancia*, *Lycæna shasta*, *Pamphila Snowi*, and others. JOHN & HURD COMSTOCK, 1572 Ridge Ave., Evanston, Illinois.

LEPIDOPTERA.—Western and northern *Argynnis* especially desired, but will exchange for anything new to collection or for perfect specimens of less rare material. I offer *Chionobas oeno*, *Brucei*, *Uhleri* and *Chryxus*; *Colias Meadii*, *Scudderi* and *Alexandra*; *Melitæa Brucei*, *minuta*, etc. Also many *Argynnis* and local species of *Catocalæ*. ARTHUR J. SNYDER, Belvidere, Illinois, U. S. A.

LEPIDOPTERA.—I would like to correspond and exchange with some new beginners. PHINIUS WHITING, 106 Fairmount St., Lowell, Mass., U. S. A.

I WILL make collections of Lepidoptera in the Mississippi Valley in exchange for specimens of other localities. Address: G. H. ROSS, Burlington, Iowa.

WILL COLLECT insects of all orders from this locality for entomological publications not in my library. REV. J. W. STACEY, Clarksville, Mich.

ARGYNNIDS WANTED.—*Arg. atlantis*, *electa*, *leto*, *cypris* and *aphrodite*. Have numerous duplicates for exchange, chiefly amongst Noctuidæ. F. H. WOLLEY DOD, Box 225, Calgary, Alberta.

WANTED.—Lepidoptera from Canada and U. S. A., in papers, correctly named, in exchange for Lepidoptera of the world, correctly named. W. NEUBURGER, Halensee-Berlin, Lutzenstrasse 10, Germany.

WANTED.—Fresh specimens of all the species of *Andrena* to be met with in various localities in North America north of Mexico; this for the purpose of working over the genus. Address: L. BRUNER, care University of Nebraska, Lincoln, Neb.

PLUSIAS WANTED.—Having just described some new *Plusias*, all from females, I wish to obtain males of these and specimens of others in which my series is short. Very liberal returns. DR. R. OTTOLENGUI, 80 West 40th Street, New York.

EUROPEAN COLEOPTERA.—I have a large quantity of European Coleoptera which I wish to exchange for American. Lists furnished. PAUL J. ROELOFS, 90 Rue van Straelen, Antwerp, Belgium.

TENTHREDINOIDEA.—Sawflies from all parts of Canada desired for study, with view to publication of catalogue. Material will be returned or exchanges made. W. HAGUE HARRINGTON, P. O. Dept., Ottawa.

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SOME NEW BYTHOSCOPIDÆ FROM BRITISH COLUMBIA AND THE SOUTHWEST.

BY E. D. BALL, UTAH AGR. COLLEGE, LOGAN, UTAH.

Every collection of western Bythoscopidæ that the author has examined has had a more or less heterogeneous assemblage of forms closely resembling *Idiocerus alternatus*. These have been somewhat indiscriminately divided between *alternatus*, *ramentosus* and several MS. names of Uhler's in classification, or not determined at all. At the time of publication of the key to this genus,* the material at hand was not sufficient to warrant the descriptions of these forms, and they were omitted. Since then the author has paid special attention to the collecting of this group in Colorado, and has received a long series of specimens from the Pacific Coast, mainly from the collection of Mr. C. Livingstone. With this material it has been possible to accurately define a number of these species and clear up much of the obscurity in this section of the genus. During the progress of this study several other new species and varieties have been described, and are also presented here.

Macropsis bisignata, n. sp.

Size and form of *apicalis* nearly, slightly more elongate, slightly resembling *misella*, but differently marked. Bright green, the inner half of clavus, the apical cells and all of the membrane testaceous brown. Length: ♀, 5 mm.; ♂, 4 mm. Width, 2 mm.

Head much narrower than posterior angles of pronotum; vertex longer than in *apicalis*, and very slightly angled in front. Face as in *apicalis*, but the front much more inflated; elytra long and rather narrow, heavily clothed with stiff black hairs; Female segment over half longer than the penultimate, the posterior margin rounding, with a small

*Dav. Acad. Nat. Sci. Proc., Vol. VII. p. 124, 1899.

rounding median notch ; whole segment often elevated so as to give it the appearance of being angularly emarginate from the lateral angles. Male valve nearly twice as long as the ultimate segment, posterior margin rounding, disc convex or slightly angularly elevated.

Colour : deep green, the inner two-thirds of clavus from the pronotum back to the middle, where it is abruptly truncate, the membrane and apical cells reddish brown, elytral hairs black.

Described from twenty-four specimens from Holly, Trinidad, Pueblo, Palmer Lake and Fort Collins, Colo.

Pediopsis trivialis, n. sp.

Resembling *viridis*, but larger, as large as *erythrocephala*, but with longer, narrower elytra than in either species. Light green, the male but little darker. Length : ♀, 6 mm.; ♂, 5 mm. Width, 1.5 mm.

Vertex very nearly right angled, slightly more acute than in *erythrocephala*, much more than in *viridis*; pronotum rather narrow, the rugæ fine and distinct; elytra long and narrow, with long apical cells.

Colour : female entirely light green, no mark on propleura; male light green, the tips of the elytra often slightly embrowned, the tip of the rostrum an oval spot on the propleura, the apices of the anterior tibiae and the apical segments of all the tarsi black.

Described from twenty-four specimens from Fort Collins, Lamar and Rocky Ford, Colo. In the key this species would follow *erythrocephala*, to which it is allied in size and shape of vertex. The absence of colour markings in either sex and the unmarked propleura of the female will at once distinguish it, however. The larger size and more sharply-angled vertex will separate it from all the other green forms.

Idiocerus dolosus, n. sp.

Form and general appearance of *crataegi*, slightly broader and darker. Face and pronotum irregularly immaculate with brown. Length, 5-5.5 mm.; width, 1.8 mm.

Head as broad as in *crataegi*, much broader than in the other deep-headed species. Vertex not as much curved as in *crataegi*, longest against the eyes. Face very deep and straight, front full and rounding as in *Provancheri*; clypeus short, constricted in the middle and much widened just at the apex; elytra similar to those of *crataegi*, inclined to be more flaring, giving the insect a more robust appearance; venation somewhat obscure, three anteapical cells, the outer one short. Female segment shorter than in *crataegi*, the posterior margin broadly rounding,

with a shallow median notch. Male valve transverse, the posterior margin but little rounding, slightly longer than the ultimate segment.

Colour: vertex and face pale yellow, two large angular black spots on the vertex, about their own width from the eyes and almost touching the hind margin; rest of surface irregularly maculate with large brownish fuscous spots, usually a pair between the black spots and another pair below them, the lateral sutures of front and clypeus from antennæ down, including all of apical half of clypeus, except a narrow median line, deep black; pronotum pale, irregularly marked with brownish fuscous, omitting a median line expanded in front; scutellum pale, with a pair of black triangles within the lateral angles, and a pair of spots on disc; elytra smoky brown, the nervures and margins back to the apical cells light.

Described from twenty-four examples from Dolores, Colorado Springs and Fort Collins, Colo.; all from within the mountains. This is a distinct and well-marked species, allied to *crataegi*, but at once distinguished by the more complex venation and large number of spots, as well as the black "Y" of the face.

Idiocerus formosus, n. sp.

Smaller and narrower than *lachrymalis*, resembling the European *populi* in size and form, but more heavily marked. Length: ♀, 6 mm.; ♂, 5.25 mm. Width, 1.8 mm.

Vertex long, but little curved; face almost flat, front broad below, but not expanded as much as usual at the antennæ; elytral nervures non-tuberculate, outer apical nervure curving away to costa without forming an anteapical cell, or, at most, a short triangular one. Female segment short, transverse, the middle third produced into a rounded lobe nearly twice as long as the rest of the segment; pygofers moderately long, much inflated, exceeded by the ovipositor by about twice its width. Male valve trisinate; antennal discs large, about twice longer than wide.

Colour: vertex and face pale greenish yellow, a pair of round black spots on the vertex and a pair of elongate spots against the eye, both pairs of spots connected on their lower margins by a transverse black band; another pair of black spots within and beneath the ocelli, on the front. The black band and spots on the front are sometimes absent in the male. Pronotum grayish or greenish, with irregular fuscous markings on the anterior third; scutellum pale yellow or greenish, usually with the basal angles and a pair of round spots on disc fuscous; elytra varying from

tawny to dark brown, usually iridescent, the apices of the claval nervures and an irregular oblique band back of the clavus milky white. Sometimes there is more or less of milky white between the dark nervures on the base of the corium.

Described from twenty-four specimens from Happy Hollow, Ward, North Park, Salida and Rico, Colo. The face and pronotal markings are similar to *lachrymalis*, while the elytra, especially in the male, are quite different. It should follow that species in the key, from which the small size and long antennal discs will readily separate it.

Idiocerus concinnus, n. sp.

Size and general appearance of *brunneus*, more highly coloured, resembling *rufus*, but larger, broader, and with antennal discs. Length, 5.5 mm; width, 1.75 mm.

Vertex and face moderately broad, much less inflated than in *brunneus*, margins of genæ but slightly rounding; elytra nearly opaque, the venation indistinct; nervures with setigerous punctures; outer anteapical cell present, rather long. Female segment almost twice the length of the penultimate; posterior margin slightly rounded, often slightly sinuate; pygofer stout, moderately long, twice longer than in *brunneus*, nearly half longer than in *amabilis*, the ovipositor exceeding them by its own width. Male valve with a blunt median tooth, distinctly exceeded by the strong lateral angles; antennal plates large, oval.

Colour: Female pale cinnamon brown, the pronotum darker; face and all below yellow. Male darker, especially along the dorsum of elytra, where the dark tergum shows through. Face and below pale yellow, with faint stripes beneath the eyes.

Described from numerous specimens from Vancouver Island, B. C. (Livingstone). This has been received as *rufus*, G. and B., but it is quite distinct. The discs of the male antennæ alone would readily distinguish them. It more closely resembles *brunneus*, from which the third anteapical cell and the distinct genitalia, as well as the absence of spots on vertex, will readily separate it.

Idiocerus amabilis, n. sp.

Resembling *amoenus* in form and general appearance, but much stouter and more highly coloured. Pale fulvous brown, with light markings along the median line, and greenish margins to the elytra. Length, 6 mm.; width, 2 mm.

Vertex and face broad and flat; nervures of elytra tuberculate; outer anteapical cell short, the outer nervures often faintly outlined. Female segment half longer than penultimate, very slightly produced on middle half; pygofer short and very stout, but little exceeded by the ovipositor. Male valve transverse, excavated either side of a median tooth. Antennæ with rather large discs, nearly twice longer than wide, and tapering at both ends.

Colour: vertex and upper part of face, down to ocelli, in female, fulvous brown, omitting a median line above, pale creamy below. Male: face creamy, washed with fulvous above and usually greenish below, a brown stripe beneath each eye and usually one on the front. Pronotum fulvous brown, a median stripe and a round spot in the middle of either side white; scutellum fulvous, darker near the basal angles, a definite spot near the apex, and often a pair of irregular ones on the disc; elytra brownish fulvous, shading to greenish on the costa, the sutural margins fuscous, interrupted by a common white spot on the apices of the outer claval nervures and an obscure white band just back of clavus, usually evident on the first two nervures of corium.

Described from twenty-four specimens from Vancouver Island, B. C. (Livingstone), North Park, Home, Gunnison and Salida, Colo.

Idiocerus femoratus, n. sp.

Resembling *alternatus*, larger and darker; female with a shorter ovipositor and a longer segment, male with the middle femora greatly inflated, more than five times as large as the anterior ones. Length, 6 mm; width, 2 mm.

Head very broad; vertex distinctly curved, sometimes slightly angled in front; face nearly flat, strongly retreating; venation as in *alternatus*, the outer anteapical cell long and parallel margined. Female segment much longer than in *alternatus*, parallel margined or slightly rounding posteriorly, ovipositor exceeding the moderately-long pygofer by about twice its width. Male antennæ with small oval discs on long setæ. Intermediate femora in male from five to ten times as large as the anterior ones, over half as wide as long.

Colour: vertex with a pair of rather large round spots, usually obscured by a band of irregular fuscous irroration that extend down to the face; lower part of face with a few brown irroration in female, usually traces of four brown stripes in male; pronotum irregularly brownish and milky white, with a few black spots on the anterior

submargin; scutellum with the basal angles, a median line and two discal dots fuscous; elytra smoky subhyaline, the nervures darker, interrupted with light; legs light, all the femora and tibiæ lineate with fuscous on the outer (upper) faces.

Described from twenty-four examples from the mountains west of Fort Collins, Ward, Palmer Lake, Marshall Pass and Lizard Head, Colo. The larger size and darker face will distinguish the female of this species from *alternatus*; the enlarged femora render the male quite distinct in the genus.

Idiocerus ensiger, n. sp.

Size and form of *alternatus* nearly, slightly longer, but with a remarkably long ovipositor in the female. Colour pale chestnut and white. Length, 5.25 mm.; width, 1.8 mm.

Face moderately convex, retreating from the narrow vertex, front short, broad, sharply angulate at antennæ; elytra with a moderately long outer anteapical cell. Female segment moderately long, transverse, the posterior margin straight; ovipositor as long as the rest of the body, exceeding the long pygofer by more than one-third, sometimes almost half, of its length.

Colour: vertex and face pale chestnut, a pair of small spots on vertex and the ocelli dark; pronotum and scutellum chestnut, the basal angles of the latter sometimes dark; elytra subhyaline, with a pale cinnamon-brown reflection, a few of the nervures darkened and usually a light stripe along the suture, which may be emphasized as a pair of spots or continued as a stripe on the pronotum.

Described from nine females taken at Home and Dutch Georges, both mountain places on the Poudre River, Colo. Very few species of *Idiocerus* are sufficiently distinct to be described from one sex alone, especially the female, but the remarkable sword-like ovipositor of this species would seem to warrant that distinction.

Idiocerus musteus, n. sp.

Form and structure of *femoratus*, but smaller. Dull cinereous, clouded with pale olive and brown, a pair of spots on the vertex and usually a few marks on pronotum and scutellum. Length, 5 mm.; width, 1.8 mm.

Face but slightly convex, very deep, margins of genæ straight or slightly emarginate, not angled; elytra long, narrow at apex; nervures with setigerous punctures; outer anteapical cell long and narrow. Female

segment long, broadly rounding posteriorly; pygofers moderately long, much inflated, the ovipositor exceeding them by about twice its width. Male antennæ with very slight black-marked enlargements some distance from the apex.

Colour: face pale yellow, a pair of round black spots on vertex, and sometimes a cloud of olive brown between them; pronotum olive and cinereous, with about six small black spots on the middle half; scutellum pale yellow, with its basal angles and a pair of spots on disc brown or black; elytra pale subhyaline olive brown, the tips of the outer claval nervures and sometimes a spot on the inner sector of corium just beyond apex of clavus milky white; legs and below pale.

Described from twenty-four specimens from Vancouver Island, B. C. These, together with the specimens of *concinus* and *amabilis*, were part of a nice lot of Jassids sent me several years ago by Mr. Livingstone.

Idiocerus verrucosus, n. sp.

Form and general appearance of *brunneus*, but much smaller, with a long anteapical cell and simple antennæ. Pale cinnamon brown, with heavy dark markings on vertex and front. Length, 4.25 mm.; width, 1.5 mm.

Face broad and very deep, not retreating until nearly the middle of front, sides of genæ perfectly straight; pronotum very short and broad; elytra with the nervures heavily tuberculate, the outer anteapical cell long and narrow. Female segment long, slightly rounding posteriorly; pygofers moderately long and stout, much longer and stouter than in *brunneus*, exceeded by the ovipositor by about twice its width. Male valve long, but feebly excavated each side the middle. Male antennæ with a very fine filament.

Colour: pale cinnamon brown, tinged with fuscous in the male; vertex and face down to antennæ with a dark brown or fuscous band, the black spots on vertex surrounded by light circles, and the ocelli in the inner ends of transverse light dashes. In light examples this band may be wanting or only present as a pair of black marks against the eyes. Pronotum and scutellum marked as in *musteus*.

Described from nine specimens from Dutch Georges and Ward, Colo.

Idiocerus morosus, n. sp.

Form and general appearance of *alternatus* nearly, but smaller, darker, and with a deeper head; structure of *verrucosus* nearly.

Male antennæ with large, nearly circular plates. Length, 4.25 mm.; width, 1.4 mm.

Head much deeper than in *alternatus*, nearly perpendicular down to the antennæ in the female, sloping in the male; venation as in *alternatus*. Female segment slightly rounding posteriorly; pygofer long and slender, exceeded by the ovipositor by two and one-half times its width. Male antennæ with large oval or nearly round discs, about twice as large as in *alternatus*.

Colour: vertex and face pale creamy, a pair of large round spots on vertex; face in the female irregularly mottled with rust brown or fuscous, omitting a pair of circles around the spots on vertex, a pair of oblique spots just outside the ocelli, and a broad stripe down the front. Male face with a pair of crescentiform fuscous dashes outside the spots on vertex, a pair of narrow brown lines down the front, a wider pair on the sutures, and a still wider pair outside; the outer pair and sometimes the middle ones fuscous. Dorsal markings as in *alternatus*, usually somewhat darker in the male.

Described from twenty-four specimens from Alder, Fort Collins, Colo., and the mountains west of the latter place up to 8,500 feet. The small size, deep head and attenuate ovipositor readily separate this from *alternatus*. The antennal plates alone will distinguish it from *verrucosus*, to which in head characters and colour pattern it is closely allied.

Idiocerus obstinatus, n. sp.

Resembling *dolosus* in form and colour, but smaller. Size of *verrucosus* nearly, but with broader elytra. Length, 4.5 mm.; width, 1.5 mm.

Vertex shortest in the middle; face sloping, but slightly convex; elytra inclined to be flaring, narrowing before apex; outer antepical cell long and narrow. Male valve short and strongly trisinate; antennæ with a moderate-sized oval disc.

Colour: vertex and face creamy yellow, a pair of very small round spots on vertex, a pair of brown dashes outside of these, a median stripe down face, fuscous in the middle and constricted above the ocelli, and a pair of shining black stripes beneath the eyes; pronotum washed with very pale brown, a few irregular spots in front; scutellum pale, with the angles and a pair of spots on the disc brown; elytra milky subhyaline, the nervures heavily fuscous, omitting the base, the costal margins,

a transverse band back of clavus and a few spots on disc; legs and beneath pale.

Described from two males from Arizona. This is a very distinct form, resembling *crataegi* and *dolosus* in colour marking, but belonging to the *alternatus* group in structural characters.

Idiocerus suturalis, Fitch.

This is either a very variable species in colour markings, and somewhat so in structural characters, or else two or more specific types are commonly referred to under this name. In the material before me there are four forms represented, all agreeing in general form and size, but possessing slight structural differences, and marked coloration characters. In general these forms have not been found associated in such a way as to indicate specific identity, but, on the other hand, in no case has the life-history been sufficiently worked out or enough specimens collected to enable one to accurately define specific limits, and it has been thought best to characterize them, for the present at least, as varieties.

Variety *suturalis*, Fitch (typical form).

The typical form is of a yellowish-green colour, becoming lighter towards the margin, with the basal angles of the scutellum and the scutellar and sutural margins of elytra included in a confluent stripe of a rich brown. This stripe narrows down at apex of clavus and then widens and gives way to a smoky area on the membrane. The outer anteapical cell is usually present in this form, and the antennal disc of the male is moderately large, oval, and about half longer than wide.

This form was described from N. Y., and is at hand from various points in the mountains of Colo., and has been examined from N. Mex. The other references to this species either refer to this form or the next.

Variety *lunaris*, n. var.

Size and form of typical *suturalis*, the outer anteapical cell wanting or rarely present as a small triangle in the apex of the costal nervure. Male antennæ with the filament slightly swollen on the apical half and dark coloured, scarcely to be called a disc.

Colour: pale green, a dorsal stripe wider than in *suturalis*, covering the entire scutellum and extending forward to the posterior margin of pronotum, deep fuscous. This stripe is interrupted on the middle of the clavus by a broad, light crescent, and marked at the apex by a line.

Described from twenty-four examples from Palmer Lake and Fort Collins, Colo., and Beula, N. Mex. This form has also been examined in the past from N. Y.

Variety *continuus*, n. var.

Somewhat stouter than *lunaris*, the outer anteapical rarely present as in that form, and the antennæ in male dark, but scarcely swollen apically.

Colour: pale green or yellowish green, the dorsal stripe even broader than in *lunaris*, covering the whole disc of the pronotum and extending forward nearly to the margin on the median line, black or very dark brown. This stripe is as wide as the scutellum, and is constricted at apex of clavus, beyond which it is smoky.

Described from twenty-four specimens from Ward, Antonito, Estes Park and Rico, Colo.

Variety *vagus*, n. var.

Slightly larger than *suturalis*, even broader than *continuus*, especially in the female, outer anteapical cell rarely present. Male antennæ with a disc similar to *suturalis*, but rounder. Female ovipositor exceeding the pygofer by three or four times its width.

Colour: female pale green, the scutellum with a pair of large dark spots within the basal angles, tergum with the disc dark; elytra subhyaline, the apical nervures dark, and the dark tergum showing through. Male with the dark nervures and scutellar spots as in the female, the elytra and sometimes the posterior part of the pronotum irregularly clouded with fuscous or smoky brown.

Described from eleven examples from North Park and several males from Alder, Home, Rist Canon and Palmer Lake, Colo. The females of this form are quite distinct, but the males sometimes approach *continuus* in colour, but they never have the stripe definitely margined as in that form, and the antennal disc is quite different.

Idiocerus rufus, var. *cingulatus*, n. var.

Size and form of *rufus* nearly, the elytra slightly longer and narrower, giving the insect, especially the females, much more of a wedge-shaped appearance.

Colour: female, face and vertex pale yellow, with rufous markings; pronotum rufous, a median line, a few submarginal spots and a pair of larger ones on the disc, white; elytra rufous, subhyaline, with two transverse light bands often obscure, but marked by the white nervures,

the anterior band crossing the cross-nervure between the sectors. Male brownish fuscous, the face light, often with a pair of spots on vertex. The submarginal spots on pronotum are united into a median crescent, and the elytra are brownish fuscous, with two broad light bands.

Described from twenty-four specimens from Fort Collins and Buena Vista, Colo. This form has been confused many times with *alternatus* and its allies, but the short ovipositor and the bright rufous pygofers in the female and the broad plates and simple antennæ in the male will readily distinguish it.

Idiocerus amoenus, var. *depictus*, n. var.

Size and form of the species nearly, female ovipositor longer and narrower. Male antennal plates slightly smaller.

Colour: female rich creamy yellow; eyes rufous; pronotum, scutellum and narrow scutellar margin to elytra testaceous brown, the colour deepening as you pass back from the vertex, a trace of testaceous on the sutural margin before the apex of clavus. Male pale creamy yellow; basal angles of scutellum, scutellar margins of elytra, a spot before apex of clavus and the apical nervures testaceous. Whole apex of elytra smoky.

Described from two females and one male from Alameda Co., Calif. Collected by E. M. Ehrhorn. This neat little form is remarkably distinct in colour, but the structural characters are not of sufficient value to separate it from *amoenus* on the small amount of material on hand.

NOTES.

MR. E. DWIGHT SANDERSON, Entomologist of the Delaware Agricultural Experiment Station, Newark, Del., has been appointed Professor of Entomology at the Agricultural and Mechanical College of Texas. His address is now College Station, Brazos Co., Texas.

Prof. Elmer D. Ball, M. Sc., of the Department of Zoology and Entomology in the State Agricultural College, Fort Collins, Colorado, has been elected to the chair of Animal Biology in the Utah Agricultural College, Logan, Utah.

CALLOSAMIA ANGULIFERA.

BY A. RADCLIFFE GROTE, HILDESHEIM, GERMANY.

Through the great kindness of a friend, I have received cocoons of *Callosamia angulifera*. These are stemless, and at once distinguishable from those of *C. promethea*. This character bears out the theory (see CAN. ENT. for April, p. 94) that *C. angulifera* is the older, more generalized form in the genus. In my work on the Saturnians, June, 1896, I tried to show that the stemmed cocoons of *Philosamia*, *Attacus* and *C. promethea* were specializations and a more modern development, and gave probable reasons for the acquirement of the habit of fixing the cocoon to the branches, so that it might not fall with the leaf in the autumn (l. c., pp. 15-16; also Plate I.). I have shown that, in a general way, the specialization of the Attacid cocoon keeps pace with the specialization of the imago in the whole group. But these specializations do not move exactly together, and the independence of the different stages in this respect is decidedly indicated. In the case of *C. promethea*, the male has evidently more recently become black, while the cocoon has added the stem wanting in the supposed primitive form: *C. angulifera*. But *Samia* shows no disposition in this direction, and yet the imago must be considered more specialized as compared with *Callosamia*. The specializations are unequal throughout, not only as between the different stages of larva, chrysalis and perfect insect, but development is hastened or retarded in different parts or organs in the same stage. Until this is appreciated, judgment will constantly be at fault in classifying these insects. The characters upon which genera are founded are those of comparative specialization.

In the passage of *Samia* to *Rothschildia*, the tendency to form a stem to the cocoon becomes apparent, evidently controlled by the nature of the food-plant. I have suggested (l. c.) that this habit of fixing the cocoon to the tree by an artificial stem spun round the leaf and fastened to the twig above, is correlated with the increase of the wings in surface dimension. My studies on the species of *Samia* are not concluded. So far it appears not improbable that the Eastern forms, *Columbia*, *Gloveri*, *Cecropia*, are developments of the Western *Californica* (*Ceanothi*).

TWO NEW MEALY-BUGS FROM NEW MEXICO.

BY T. D. A. COCKERELL.

Phenacoccus cevalliae, n. sp.

♀. Oval, 4 to 5 mm. long, pale olive green, but covered with white secretion, with lateral tassels and thick caudal tassels; placed in alcohol, they stain the liquid pale green; alcoholic specimens appear strongly segmented, with two longitudinal blackish bands, best marked in rather immature specimens. Eyes prominent; skin with many small circular glands; the lateral patches consist of about twelve glands each, but are without spines; a few rather large bristles scattered about the body; legs and antennæ reddish-yellow; denticle on inner side of claw rudimentary, just visible; antennæ 9-jointed, the club 2-jointed. Measurements of antennæ and legs in μ : Anterior legs, femur and trochanter 470, tibia 330, tarsus 130; hind legs, femur and trochanter 540, tibia 440, tarsus 135. Antennal joints: (1.) 45-60, (2.) 108-111, (3.) 63-66, (4.) 60, (5.) 72-75, (6.) 51, (7.) 51, (8.) 45, (9.) 67.

Newly-hatched larva very pale lemon-yellow, about twice as long as broad; eyes conspicuous.

Hab.—In enormous numbers on *Cevallia sinuata*, near Lea Lake, east of Roswell, N. M., Aug. 21, 1902. Much preyed upon by Coccinellids (*Hyperaspis*) and Chalcidids. It is allied to *P. solenopsis*, but from its large size and abundant secretion, it looks like a *Ceroputo*. Professor Tinsley was with me when the species was discovered, and we both thought it a relative of *C. yuccæ*.

Pseudococcus Neomexicanus (Tinsley), var. *alkalinus*, n. var.

♀. About $2\frac{1}{2}$ mm. long and $1\frac{1}{4}$ broad, covered with mealy-white secretion, with short, thick, cottony caudal tassels, and lateral tassels posteriorly; secreting a thin but dense white sac, which covers all but the hind end of the insect. These sacs are often irregularly stained with bright yellow. ♀ (after boiling in water and mounting in oil of cloves) bright orange; antennæ and legs light yellowish-brown; no produced caudal tubercles; labium 120 μ long and about 78 broad; eyes prominent; caudal bristles about 75 μ long; bristles of anal ring about 66 μ ; legs quite stout, breadth of anterior tibia 36 μ ; claw with no denticle on inner side; claw digitules very slender; no distinctly knobbed tarsal digitules; antennæ 8-jointed. Measurements of legs and antennæ in μ : Anterior legs, femur and trochanter 210, tibia 135, tarsus 69; hind legs, femur and trochanter 231, tibia 174, tarsus 78. Antennal segments: (1.) 45-54, (2.) 48-54, (3.) 36-41, (4.) 24-30, (5.) 24, (6.) 22-24, (7.) 24-25, (8.) 66-78.

Eggs red; eggs in body of ♀ contained well-developed larvæ, and are about $336\ \mu$ long and 180 broad.

Hab.—Roswell, N. M., on a low grass in an alkaline spot, abundant on the leaves and stems, Aug. 24, 1902. I believe this is a distinct species, but it is so close to *P. Neomexicanus* (*Dactylopius Kingii* *Neomexicanus*, Tinsley, 1898) that no harm will be done by treating it as a variety for the present. It has a Chalcidid parasite, a species with very pale legs, and the apical portion of the antennæ white, the basal part black.

Two other species allied to the present one are *Pseudococcus roseotinctus* (*Dactylopius roseotinctus*, T. & W. Ckll.) and *P. salinus* (*D. salinus*, Ckll.). All these form a little group with a characteristic type of antenna, different from that of the Eastern mealy-bugs.

NOTES ON SOME GENERIC NAMES EMPLOYED BY SERVILLE, IN THE REVUE METHODIQUE, AND FIEBER, IN THE SYNOPSIS DU EUROPAISCHEN ORTHOPTERAN.

BY JAMES A. G. REHN, PHILADELPHIA, PA.

As has been shown by several previous writers, the Synopsis published in instalments by Fieber, in *Lotos*, Volume III., all appeared on or before August, 1853. Such being the case, all his new generic names have precedence over those of L. H. Fischer,* the preface of whose work bears the date, November, 1853, and which is unlikely to have appeared before 1854.

FORFICULIDÆ.

CHELIDOURA, Serville. *Ann. Sci. Nat.*, XXII., p. 36, 1831.

Usually quoted in the corrected form used by Burmeister—*Chelidura*.

BLATTIDÆ.

PERISPHERUS, Serville. *Ibid.*, p. 44.

Usually quoted as *Perisphæria*, an emendation.

MANTIDÆ.

BLEPHARIS, Serville. *Ibid.*, p. 47.

As this name is preoccupied by *Blepharis*, Cuvier (*Regn. Anim.*, II., p. 322, 1817), I propose *Blepharopsis* in its place.

*Orthoptera Europaea, Lipsiæ.

PHASMIDÆ.

CYPHOCRANA, Serville. Ibid., p. 60.

Usually quoted as *Cyphocrania*.

ACRIDIDÆ.

CALEPHORUS, Fieber. Lotos, III., p. 97, May, 1853.

Antedates *Oxycoryphus*, Fischer (Orthopt. Europ., p. 311).

CHORTHIPPUS, Fieber. Ibid., p. 100, May, 1853.

Antedates *Stenobothrus*, Fischer (Ibid., p. 313).

DOCIOSTAURUS, Fieber. Ibid., p. 118, June, 1853.

Antedates *Stauronotus*, Fischer (Ibid., p. 351).

AIOLOPUS, Fieber. Ibid., p. 100, May, 1853.

Antedates *Epacromia*, Fischer (Ibid., p. 360).

PEKILOCERUS, Serville. Ann. Sci. Nat., XXII., p. 275, 1831.

Usually quoted as *Pæcilocerus*.

PRIONOTROPIS, Fieber. Lotos, III., p. 127, June, 1853.

Antedates *Cuculligera*, Fischer (Orthopt. Europ., p. 390).

PELECYCLUS, Fieber. Ibid., p. 119, June, 1853.

Antedates *Platyphyma*, Fischer (Ibid., p. 373).*

OPSHOMALA, Serville. Ann. Sci. Nat., p. 267, 1831.

Usually quoted as *Opsomala* or *Opomala*.

CALLIPTAMUS, Serville (Ibid., p. 284).

Usually quoted as *Calliptenus* or *Caloptenus*.

EUPREPOCNEMIS, Fieber. Lotos, III., p. 98, May, 1853.

Usually quoted in the emended form, *Euprepocnemis*.

TETTIGONIDÆ.

POLYSARCUS, Fieber. Ibid., p. 174, August, 1853.

Antedates *Orphania*, Fischer (Orthopt. Europ., p. 222).

XIPHIDION, Serville. Ann. Sci. Nat., XXII., p. 159, 1831.

Usually quoted as *Xiphidium*.

*Scudder (Proc. U. S. Nat. Mus., XX., p. 90), in treating the name *Podisma*, Latreille, came to the conclusion that *Pezotettix*, Burmeister, should replace *Platyphyma*, Fischer. As there set forth, *Podisma* possessed two originally-included species, which two, "and these only," were the species on which Burmeister's genus *Pezotettix* was founded. In such cases the golden rule, "once a synonym, always a synonym," should be applied, and *Pezotettix* should be relegated to its true position as a synonym of *Podisma*, subsequent restriction having no validity where originally included species are identical.

THE BEE GENUS *DIALICTUS*.

BY J. C. CRAWFORD, JR., WEST POINT, NEBR.

Table for the separation of the species :

Black..... *lustrans*, Ckll.
 Greenish or bluish.

Tegulæ dark.

Bluish; abdomen with metallic lustre; face narrow.. *Theodori*, n. sp.

Greenish; abdomen without metallic reflections; face

broader..... *occidentalis*.n. n. for *anomalus*.

Ckll. (non Robt.).

Tegulæ testaceous..... *anomalus*, Robt.

D. anomalus, Robt. Specimens from Dr. Graenicher, collected at
 Milwaukee, were examined.

D. occidentalis, n. n. for *D. anomalus*, Ckll.

Ann. and Mag. Nat. Hist., Ser. 7, VII, 126 (Jan., 1901).

This differs from the true *anomalus* in its larger size, more densely punctured mesothorax, finer and more numerous lines on the metathorax, dark tegulæ, abdomen distinctly punctured, quite closely on the second segment; denser pubescence on the abdomen nearly concealing the surface on the apical segments; apical margins of abdominal segments testaceous.

D. Theodori, n. sp.—♀. Head and thorax blue, face closely and rather coarsely punctured and with sparse white pubescence; antennæ dark; flagellum obscurely ferruginous beneath toward apex; mesothorax rather sparsely and finely punctured and finely tessellate; metathorax rugose on base, rugæ not reaching apex; tegulæ dark; wings hyaline, nervures yellowish; legs dark, apical joints of tarsi ferruginous; inner spur of hind tibiæ with 4 long teeth; pubescence of legs white; abdomen black, thinly clothed with white pubescence, more dense apically, and with metallic reflections; apical margins of segments testaceous.

Type.—One specimen (Las Vegas, N. M., May 29, 1902), on *Convolvulus incanus*. Miss Pearl Hitchcock, coll.

Dedicated to Prof. Cockerell, from whom it was received.

NEW SPECIES OF SEMIOSCOPIS.

BY HARRISON G. DYAR, WASHINGTON, D. C.

The following species of *Semioscopis* (*Epigraphia*) seem undescribed. They were sent for names by Messrs. F. A. and H. D. Merrick, of New Brighton, Pennsylvania, and have been donated by them to the National Museum. These new species closely resemble several of the European ones, yet seem all specifically separable.

Synopsis of North American species of Semioscopis.

Wings sharply trigonate, apex pointed, costa straight.

Discal mark a curved bar.

Discal mark continued to base of wing by a long, bent black bar..... *Packardella*.

This bar sharply abbreviated at one-third from base... *Merricella*.

This bar broken into rods and dots, obscurely reaching base..... *aurorella*.

Discal mark not produced toward base in a bar..... *megamicrella*.

Discal mark a pair of superposed dots..... *inornata*.

Wings not trigonate, costa arched at base as in *Depressaria*. .. *Allenella*.

S. Packardella, Clem. (*eruditella*, Grt.).

Two specimens from Michigan (C. P. Gillette) are in the National Museum.

S. Merricella, n. sp.

Palpi blackish, second joint whitish at base and tip, third joint whitish, a black spot outwardly at base and black ring before tip; thorax gray, abdomen sordid ochreous. Fore wings light shining gray, slightly shaded with brown, darkly so beyond end of cell and on costa before apex, irrorated rather uniformly with blackish. A large, curved, black bar in the cell, reversed as to curvature with the discal mark; a row of irregular terminal black spots between the veins. Hind wings and under side silky gray, fringes paler. Expanse 27 to 31 mm.

Two specimens, New Brighton, Pa. (H. D. Merrick), March 15 and 22, 1902.

U. S. Nat. Mus., type No. 6609.

S. aurorella, n. sp.

Palpi essentially as in the preceding. Wings silky gray, fore wings roseate tinged, the basal two-thirds of costa broadly and top of head more

whitish. Wing finely irrorated with black; a curved discal streak, two superposed dashes in the cell, a basal subcostal dash and one from base below median vein to opposite middle of cell, black; three triangularly placed short dashes before apex, an ill-defined subterminal and a terminal row of intravenular black dots. Fringes pale, slightly roseate. Expanse 25 to 30 mm.

Four specimens, New Brighton, Pa. (H. D. Merrick), March 20, 21 and 27, 1902.

U. S. Nat. Mus., type No. 6610.

S. megamicrella, n. sp.

Palpi as in the preceding. Fore wings whitish gray, slightly shaded with fuscous, especially beyond end of cell and with scattered brown scales; fine black scales along costal edge and a shaded spot above discal mark, which is curved and black, in one of the specimens (on one side only), broken into a pair of dots; two superposed dots before middle of cell; three subapical dots in a triangle continued as a submarginal row; a terminal row of dots. Hind wings silky gray, fringe pale. Expanse 18 to 25 mm.

Eight specimens, New Brighton, Pa. (H. D. Merrick), March 7, 10, 20, 21 and 24, 1902.

U. S. Nat. Mus., type No. 6611.

The smaller specimens were sent by Mr. Merrick under a different number, but, though the markings are somewhat confused and the colour a little darker, I do not find them specifically distinct.

S. inornata, Wals.

This is possibly only a varietal form of the preceding, but none of my specimens (of *megamicrella*) are anywhere nearly so large, while the discal mark is a curved streak except on one wing of a small specimen, where it is resolved into dots. There are no specimens of *inornata* in the National Museum.

S. Allenella, Wals.

This species looks like a *Depressaria* in its wing shape and markings. The National Museum has an old specimen, determined by Lord Walsingham and labelled "oak, Aug. 11, 1884"; also from New Brighton, Pa. (H. D. Merrick), May 12 and 22, 1902, and Centre Harbor, N. H. (H. G. Dyar), July 22, 1902.

SOME NEW OR LITTLE-KNOWN BEES.—IV.

BY CHARLES ROBERTSON, CARLINVILLE, ILLINOIS.

ANTHEMURGUS, gn. nov.

Glossa lanceolate, shorter than mentum; paraglossæ reaching to joint 4 of labial palpi; maxillary palpi six-jointed, longer than lamina, joints short; labial palpi with joints subequal, first one robust; marginal cell about as long as first discoidal, obliquely truncate, appendiculate; cubital cells equal, second receiving the first recurrent nervure about one-third from base and the second near apex; facial foveæ present in both sexes; tibial scopa of female thin, with rather long simple hairs.

A. passifloræ, sp. nov.—♀. Black, shining; head coarsely punctured; mesonotum closely and finely punctured, also with some scattered coarser punctures, trisulcate anteriorly; metathorax with the disc rather finely reticulated, the sides finely punctured; abdomen with apical margins of segments 1-4 shining, impunctate, segment 1 sparsely, 2-5 more closely, punctured; labrum with shining space broader at base and apex; mandibles rufous; apical half of wings clouded; middle metatarsus broader than hind one; middle spur finely pectinate, about one-fifth the length of the metatarsus; pubescence thin, short, longer on the legs, sides of metathorax and segments 5-6 of abdomen; pale, except on segments 5-6, where it is blackish. Length, 8 mm.

♂.—Resembles the female; mandibles, anterior tibiæ in front, and sometimes middle ones, and all the tarsi, reddish; a longitudinal yellow stripe on the clypeus and on each side of face. Length, 8 mm.

Carlinville, Illinois; 7 ♀, 5 ♂ specimens.

This species is oligotropic; the female gets her pollen exclusively from flowers of *Passiflora lutea*.

Perditella boltoniæ, sp. nov.—♀. Head and thorax greenish, shining, finely roughened, sparsely punctured; pubescence thin, pale; basal joint of labial palpi longer than the next three together; mandibles, except base, rufous; clypeus whitish; facial foveæ linear; legs dark, tarsi testaceous, claws simple; tegulæ pale testaceous; wings hyaline, nervures pale, subcostal nervure and borders of stigma and marginal cell darker; marginal and first cubital cells about equal, a little shorter than stigma; cubital cell 2 narrowed about $\frac{2}{3}$ towards marginal, receiving recurrent nervure 1 just within, recurrent 2 interstitial with the second transverse cubital; third discoidal cell present; abdomen depressed, obovate, blackish, segments 2-3 each with a linear whitish band on each side of base. Length, 5 mm.

♂.—Resembles the female; third discoidal cell wanting; second cubital cell more strongly narrowed above; cheeks dentate; claws cleft; mandibles, except tips, labrum, clypeus, two small spots on each side above, scape in front, anterior tibiæ in front, and tarsi, whitish; abdomen without fasciæ, apical margins of segments narrowly pale testaceous, apex reddish. Length, 5 mm.

Carlinville, Illinois; 1 ♀, 5 ♂ specimens. Three male specimens have the scape dark, one has the labrum dark, one has no spots on face outside of clypeus. The second recurrent nervure in the male is evident in certain lights, but there is no thickening.

The female collects pollen of *Boltonia asteroides*. I regard it as an oligotropic visitor of that plant, but the female may get pollen from some other species of Compositæ.

Anthidium psoraleæ, n. sp.—♀. Black, rather opaque, closely punctured; wings nearly hyaline, basal nervure ending before transverse medial, second recurrent nervure interstitial with second cubital; pulvilli wanting; mandibles with seven teeth; apex of clypeus with two teeth on each side; segment 6 of abdomen longitudinally carinate, apex bidentate, strongly sinuate laterally, with a lateral tooth; yellowish white ornaments as follows: longitudinal stripe on each side of vertex, spot on tegulæ in front, line above, spot on each side of base of scutel, and two lines on apical margin, lateral fasciæ greatly indented anteriorly on segments 2-5, broken in two on 1. Length, 11 mm.

♂. Segment 6 of abdomen with an incurved tooth on each side, 7 with three prominent teeth, lateral ones broad, with an incurved point, median one slender; ventral segments 4-5 emarginate, 6 with broad produced median portion, sides of its base sinuate; yellowish-white ornaments as follows: mandibles, clypeus, sides of face, longitudinal stripe on each side of vertex, dot on tubercles tegulæ in front, two lines on scutel, dot on anterior and middle knees, apex of tibiæ, metatarsi, two large lateral and two small discal spots on segment 1 of abdomen, anteriorly indented lateral fasciæ on segments 2-5, and two discal comma-shaped marks on 6. Length, 12 mm.

Carlinville, Illinois; 5 ♀, 14 ♂ specimens. One female has no line above tegulæ, three have no spots on sides of base of scutel. One male has no lines on scutel, four have no dots on anterior knees, five have none on middle knees, twelve have no discal spots on segment 1 of abdomen, one has the lateral fascia on segment 2 broken in two, four have no dots on tubercles.

Dianthidium boreale, n.sp.—♂. Closely resembles *D. notatum*, Latr., but the abdominal segments 6–7 have a median carina, which in the latter terminates in a tubercle; segment 6 has on each side an elevated portion, each terminating in a discal subapical tooth and a lateral apical one; pulvilli present; wings clouded, basal nervure almost interstitial with transverse medial, second recurrent nervure passing beyond second cubital; antennæ black; legs red, anterior and middle knees, apex of tibiæ and metatarsi, yellow; other yellow ornaments as follows: mandibles, face below antennæ, transverse line on vertex, tubercles, tegulæ in front, line above, four spots on scutel, large spot on each side of segment 1, arcuate fascia on each side of 2, two discal and two lateral spots on each side of 3–5, a large spot on each side of 6 covering the elevated portion, and all except base of 7. Length, 8 mm.

Carlinville, Illinois; 1 ♂ specimen.

Among several other good characters of *Dianthidium* may be mentioned the well-developed pulvilli.

Stelidium gn. nov., *trypetinum* sp. nov.—♀. Black; pubescence thin, pale; punctures coarse and close; mandibles narrow, tridentate, rufous before apex; maxillary palpi one-jointed; cubital cell 2 longer than 1, receiving both recurrent nervures about equally distant from base and apex; scutel simple; abdomen strongly conical; segment 6 longer than 5, apical margin carinate; ventral segment 6 longer than 5, nearly as long as wide, produced beyond dorsal segment, with a subapical carina; nearly obsolete whitish ornaments as follows: narrow anterior orbits, transverse spot on each side of vertex, four widely-separated equidistant spots near apical margins of segments 1–3. Length, 5 mm.

Carlinville, Illinois; 2 ♀ specimens. The venation, structure of abdomen, and the ornaments mark this as quite a peculiar form. I am quite sure it is an inquiline of *Trypetes carinatus*.

Melissodes vernonia, sp. nov.—♀. Black, clothed with pale whitish or griseous pubescence; some black hairs on the vertex in front, a subquadrate patch on the mesonotum and the scutel also with black hairs; hind metatarsi blackish beneath; segment 2 of abdomen has a narrow basal and a broader median whitish fascia; segments 3 and 4 with broad fasciæ reaching the apex of 4, and nearly reaching the apex of 3; segments 5 and 6 with pubescence black or fuscous; wings hyaline, nervures testaceous; middle of mandibles rufous; flagellum testaceous beneath. Length, 12–14 mm.

♂.—Resembles the female; pubescence nearly white throughout, thin on mesonotum posteriorly and on scutellum where it is sometimes a little blackish; clypeus, spot on base of mandibles and on labrum white; antennæ yellowish, darker above, joint 3 about twice as long as 2; wings hyaline, nervure pale, much paler than in female; segments of abdomen with broad, pale, testaceous apical margins, 2-6 with submedian narrow, arcuate, whitish pubescent fasciæ, segments 5-7 with lateral spines. Length, 13 mm.

Carlinville, Illinois; 21 ♀, 15 ♂ specimens.

The female gets her pollen exclusively from *Vernonia fasciculata*. The male is quite white and resembles a large specimen of *M. nivea*.

In my neighbourhood there are three species of bees which have been referred to *Xenoglossa*. *Melissodes strenua*, Cr., is evidently a true *Xenoglossa*. It is proposed here to make *Macrocera pruinosa*, Say, the type of a new genus, *Peponapis*, and *X. ipomæa* the type of a new genus, *Cemolobus*. In its group *Xenoglossa* is remarkable for having the antennæ of the male of the same form as in the female. In *X. strenua* the secondary sexual characters are reduced to a minimum, the mandibles, antennæ and claws of the male being about the same as in the female, and the clypeus of the female usually marked with yellow. The three species may be separated as follows:

Females.

Claws with a short inner tooth, that of the hind claw about one-fourth as long as the outer division; clypeus trilobed; mandibles with a distinct exterior angle; joint 2 of maxillary palpi nearly as long as 3-5, 4 nearly as long as 4+5; scopa nearly black; abdomen nearly black, with appressed glittering hairs; first cubital cell shorter than the third, hardly longer than the second..... *C. ipomæa*.

Claws cleft, inner tooth of hind claw more than one-half as long as the outer division; clypeus entire; scopa ochraceous..... 1.

1. Mandibles with an internal tooth at base; maxillary palpi with joints 2-5 regularly diminishing in length; abdomen with more or less interrupted fasciæ of appressed ochraceous pubescence; cubital cell 1 a little shorter than 3, much longer than 2..... *X. strenua*.

Mandibles at apex bidentate; joints 2 and 3 of maxillary palpi subequal, 3 = 4 + 5; segments 2-4 of abdomen with whitish pubescent fasciæ; cubital cell 1 about as long as 3, twice as long as 2..... *P. pruinosa*.

Males.

Hind claws long, with a very short inner tooth; hind metatarsus arcuate, bevelled at the expense of its posterior inferior border, produced anteriorly; mandibles at apex bidentate, exterior angle spined; clypeus trilobed, with transverse apical whitish band; joint 3 of antennæ about as long as 4, 5-12 slightly diminishing in length; segments 6 and 7 of abdomen with dentiform lateral apical angles..... *C. impomæ*.

Hind claws cleft; hind metatarsus simple; clypeus entire..... 1.

1. Joint 3 of antennæ = 4 + 5; base of mandibles yellow, with an internal tooth; clypeus largely yellow; segments 5 and 6 of abdomen with lateral basal spines, stronger on 6..... *X. strenua*.

Joint 3 of antennæ about one-third as long as 4, 5-12 slightly diminishing in length; mandibles tridentate, base black; clypeus with yellowish spot; apex of abdomen without spines... *P. pruinosa*.

DESCRIPTIONS OF NORTH AMERICAN BEES.

BY H. L. VIERECK, PHILADELPHIA, PA.

Coelioxys Foxii, n. sp.

Coelioxys vigilans, Fox, not Sm. Tr. Am. Ent. Soc., XVIII., 344, 1891, ♀ ♂.

Conspicuous by its deeply-punctured thoracic dorsum and the orange to yellowish pubescence.

♀. Length, 10.5 mm. Clypeus rugose, with close, large, poorly-defined punctures, covered with a fine whitish pubescence, and having a whitish moustache; sides of the face covered with a yellowish appressed pubescence; near the ocelli this becomes erect; around the latter the hairs are dark brown, and form an erect fringe; a raised space in front of anterior ocellus, tapering down in front to a point terminating between insertion of antennæ, has a longitudinal impressed line along the middle on its lower half, and branches up to on each side of the anterior ocellus impunctate, dullish, the space between and surrounding punctured; an impunctate space between lateral ocelli and eye margins; top of the head punctured, dullish, the punctures smaller than those on dorsulum, almost bare; cheeks with appressed pubescence paler than that on sides of face. Dorsum of thorax with large deep punctures, shining, the punctures on dorsulum usually well separated, those on scutellum sparse, a narrow longitudinal area on the middle of scutellum impunctate; a semi-circular collection of appressed pubescence on scutellum, a spot of

the same adjoining the tegulæ and a line on anterior margin of dorsulum orange colour. The rest of the dorsum with inconspicuous black hairs. Posterior border of scutellum with a sharp edge, only slightly produced medially, the lateral teeth short and blunt. The pleura covered with pubescence similar to that on cheeks, only so thick as to obscure the tegument on the anterior and posterior borders of the mesopleura, which are deeply punctured and dullish; the legs covered with a white pubescence, that on the tibiæ and tarsi within golden. Wings darkened brownish, especially near the margins, nervures and stigma dark brown. First adominal segment with a groove on the anterior edge formed by the sharp edge and the almost ridge curve in back of the edge, with distinct, small, separated punctures; all of abdomen polished, the apical segment less than one and a half times as long as broad at base, tapering to a blunt point at apex, slightly pinched on the sides at the middle, a median longitudinal raised line on posterior half, an impunctate line on anterior half; the punctuation on the narrow part of apical segment indistinct, that on the broader half distinct, fine, the punctures separated; the rest of the segments with punctures only on the anterior and posterior margins; all the segments, except the apical one, with a narrow apical band of yellowish appressed pubescence, a line of appressed pubescence on each side of apical dorsal segment; the ventral segments with apical bands.

Black, mandibles, tegulæ, legs, basal segment and ventral segment dark ferruginous.

♂. Length, 8.5 mm. Essentially the same as the ♀ in sculpture and coloration, with the usual exception in structural characters incident to this sex; the face uniformly covered with thick appressed pubescence; the lateral scutellar spines more produced; apical dorsal segment less than one and a half times as long as broad, at apex drawn out into four sharp spines, the emargination not so deep, more semicircular, the width from spine to spine a little more than half the width of the apical segment at base; the upper spines a little shorter than the lower ones, one spine on each side long and narrow, the broad median furrow extending to within a short distance of the base of the apical segment.

Types: Coll. Am. Ent. Society. Type locality, Port Antonio (♀), Jamaica (W. J. Fox).

The ♂ is from Kingston, Jamaica. Both specimens are part of a collection made in Jamaica during April, 1891, by Mr. C. W. Johnson and Mr. W. J. Fox.

In sculpture and structure this species comes nearest to *C. abdominalis*, Guer., but that has the abdomen all red, is larger and different in various details.

Coelioxys Slossoni, n. sp.

Head and thorax black, dullish; abdomen shining, first three segments ferruginous, the rest black; wings fulvous, darker apically; antennæ dark brown to black.

♀. Length, 12 mm. Face covered with appressed whitish pubescence, which hides the surface of the tegument; head above an imaginary line across posterior ocelli deeply punctured, the punctures separated irregularly, none very far apart. There is an impunctate line extending down to the margin of the eye from each lateral ocellus; a compact, spade-shaped, raised area in front of anterior ocellus has its borders impunctate, dull, the space within punctured. Cheeks punctured, with white appressed pubescence not so dense as on the face; dorsulum with deep, good-sized punctures not all the same distance apart, some very close, not at all widely separated, an impressed line over the anterior half of dorsulum in the middle, a narrow band of yellow pubescence extends to each side of the impressed line, curved and meeting the tegulæ at the sides; scutellum punctured, much like dorsulum, duller, the spines short and rounded. Mesopleura flattened in front, giving the side a strong edge, the sides of mesopleura punctured, much like the dorsulum, pubescence very sparse, excepting on the margins, where it is abundant, and on the sides of the metathorax. Wings with space between first transverse cubitus and first recurrent nervure on the cubitus a little greater than that between the second transverse cubitus and the second recurrent nervure on the cubitus; transverse median nervure interstitial; nervures and stigma dark brown, almost black; tegulæ testaceous. Abdomen about twice as long as broad at base, first segment with well-defined large and small punctures, the larger ones a little smaller than those on dorsulum, second segment with much the same-sized punctures as those on the first, an impunctate narrow band across the middle. On the remaining segments the pattern is the same, excepting the apical segment, the puncture on each segment a little smaller than on the preceding, the impunctate band wider; apical segment with a medial longitudinal impunctate raised line; apical segment less than twice as long as broad at base, its outline that of a cone slightly pinched in the middle, the apex rounded; dorsal

segments, except the apical one, with a narrow white fascia, narrowest in the middle, the fascia on first segment narrow from side to side.

Black; legs from ferruginous to testaceous, chiefly a dark shade of the latter; anterior and median coxæ black. The legs have a whitish pubescence, except on the inner side of tibiæ and all of tarsi, where the pubescence is golden.

♂. Length, 11.5 mm. Exactly like the ♀, except for the usual sexual characters; pubescence on face abundant and not appressed; dorsal apical segment with six spines, one on each side at base testaceous, the four at apex black, simple, the lower pair longer than the upper, sharp, the upper pair short, blunt; scutellar spines longer than in ♀, broader at apex than at base.

Types: Coll. Am. Ent. Society. The ♀ deposited by Mr. Fox.

Type locality, Lake Worth, Florida (Mrs. A. T. Slosson).

The male is labeled "Fla." Two ♀♀ from Lake Worth; the co-type is identical with the type.

Megachile manumuskini, n. sp.

Thorax shining, punctured; scopa white, on apical segment black; inner side of tarsi in both sexes brilliant brownish.

♀. Length, 14 mm. Margin of clypeus almost even, the clypeus and a small space above closely punctured, the surface shining and almost bare, the rest of the face up to the ocelli indistinctly punctured, covered with an erect whitish pubescence, which extends down and covers the lower corners of the clypeus; top of the head not so closely punctured as the clypeus, shining, sparsely covered with black hairs; checks indistinctly punctured, covered with erect pubescence whiter than that on the face; space between posterior ocelli seemingly a little greater than that between them and eye margins; mandibles the shape of an obtuse angled triangle, with four teeth, the upper surface separated from the lateral surface by a raised opaque line, the upper surface with drawn-out punctures; antennæ with the first joint of the flagellum a little longer than the second. Dorsum of thorax shining, punctures on dorsulum close together; on the sides, in front, in the middle and behind the punctures are well defined and separated; punctures on scutellum distinct, closer than those on the middle of the thorax; the thorax above almost bare in the middle, near the margins with sparse black hairs, surrounded by white hairs on the margins; surface of the rest of the thorax indistinctly sculptured; metathorax almost smooth, opaque, almost

hidden by the abundant white pubescence. The legs, except the tarsi in back, largely covered with short, almost appressed whitish pubescence. Wings brownish hyaline, nervures very dark brown; tegulæ shining, punctured. Abdomen shining, the dorsal segments with a polished, then a punctured band, an apical subopaque band finely punctured; first segment with erect whitish pubescence, the second dorsal segment with short whitish pubescence at the base, a narrow whitish band of appressed pubescence on the apical border of the punctured band; segments two, three and four with similar fasciæ, otherwise the segments have short, black, erect hairs in abundance; the apical segment is finely, closely punctured, slightly impressed on each side, black haired. Almost entirely black, claws dark brown in part.

♂. Length, 11.5 mm. Very similar to the female; hair on face yellowish, the clypeus with a long moustache, hairs on top of head pale and fine; first joint of flagellum plainly shorter than the second; anterior coxæ armed with a prominent spine; apical dorsal segment with a broad, uneven, elliptical emargination, the sides of the segment with large teeth, the right side having but one, the left side two; the pointed process of apical ventral segment long; when looked at from back, its tip is on a level with the tips of the sides of the apical dorsal segment.

Types: Coll. Acad. Nat. Sciences, Philadelphia.

Type locality, Manumuskin, New Jersey, June 24, 1901 (E. Daecke). Co-type ♀, same date, same place. One ♂, Clementon, N. J., June 5, 1901; DaCosta, N. J., July 14, 1901. The thoracic pubescence in these specimens has an ochreous tint. Two ♂♂, Iona, N. J., June 16, 1902. In one of these specimens the lateral processes and the apical process of apex of abdomen are abbreviated, but hold the same proportion to each other as the typical specimens. The species compares well with *M. frugalis*, Cress., but that differs in the distinct punctuation of head and thorax with shining surface; the emargination is regular, semicircular, the tooth beneath short. The type was compared with the type of *M. frugalis*, Cress., ♂, in the U. S. National Museum.

Frederick Smith described three species of the genus *Colletes* from North America. Up to the present time only one species, *C. thoracicus*, appears to have been identified. I submit descriptions of what are taken to be *C. mandibularis* and *C. nitidus*, the remaining species.

Colletes mandibularis, Sm.

Colletes mandibularis, Sm. Brit. Mus. Cat., I., 5, 1853. ♂. Type locality, Georgia.

♀. Length, 8 mm. Clypeus almost bare, shining, with punctures lengthened and often confluent, near the margins the punctures are more regular, the rest of the face covered with a dirty-looking pubescence, not long nor so thick as to obscure the surface, which is so closely punctured as to have a rugose appearance; the head above shining, indistinctly punctured, the pubescence longer and sparser than on face, rather yellowish; labrum with a distinct dent in the middle, to the sides polished and with traces of dents; mandibles grooved, with an almost obsolete tooth within the apex; the cheeks with a paler pubescence, the sculpture indistinct; first joint of flagellum distinctly longer than the second; hardly any space between eyes and base of mandibles; dorsulum shining, with close, distinct, deep punctures, punctures sparse in the middle of posterior half; scutellum with a few punctures. Mesopleura with distinct punctures, closer than on the dorsulum; disc of metathorax divided into pits, the middle one almost oblong, the largest, the lateral each narrower than the one before; enclosure of posterior face of metathorax with a broad neck, its surface not perfectly smooth, but shining, the neighbouring areas indistinctly sculptured, less shining than the middle area; the thorax above with a short yellowish pubescence, that on the sides whitish, the same on the legs. Abdomen subopaque, very finely sculptured with indistinct punctures, those on first segment not so close as on the rest, therefore it is more shining; the base of abdomen pubescent, much like the dorsum of thorax, the other segments with a thin, light, appressed pubescence, except the apical segment; all with a distinct fascia of appressed yellowish pubescence; ultimate segment with brown hair. Black mandibles and tibiae brownish; wings yellowish, nervures brown; stigma paler; first recurrent nerve received by the second submarginal cell a little before the middle.

♂. Length, 7 mm. Excepting the ordinary sexual characters, the male fits the description of the ♀. Face below antennae hidden with a long, yellowish pubescence; pits on disc of metathorax narrower; tarsi testaceous.

Four specimens from Georgia (Morrison), Coll. Am. Ent. Soc.

Colletes nitidus, Sm.

Colletes nitidus, Sm. New Sp. Hym., B. M., p. 1, 1879, ♀ ♂. Type locality, E. Florida.

♂. Length, 8 mm. Face below antennae hidden by long, pale pubescence, faintly yellowish; face above indistinctly sculptured,

pubescence thinner and darker than that below ; top of the head shining, also indistinctly sculptured ; cheeks roughened, with white pubescence ; labrum with a median dimple ; first joint of flagellum equal to the length of the second ; space between eyes and base of mandibles very narrow ; dorsulum shining, with small, well-separated punctures ; scutellum similar. Mesopleura closely punctured, shining ; disc of metathorax divided in the middle by a sharp longitudinal ridge, the space on each side divided into pits by less conspicuous ridges ; enclosure funnel-shaped, the neck narrow, about twice as long as wide at base, the surface polished, the neighbouring areas shining, indistinctly sculptured in spots ; thorax above covered with a slightly yellowish pubescence ; the sides, the metathorax in back and the legs covered with white pubescence ; wings yellowish hyaline, nervures light brown, the stigma almost testaceous ; first recurrent nervure received a little beyond the middle of second submarginal cell. First abdominal segment highly polished, with very fine, widely-separated punctures, the pubescence very thin and long, whitish, the rest of the segments closely, indistinctly punctured, the pubescence whitish, short and lying on the surface, the fasciæ formed by the hairs not at all prominent ; apical segment with whitish appressed pubescence.

Black ; tarsi and claws almost testaceous ; flagellum very deep brown.

One ♂ specimen from College Park, Maryland, September, 1892. (Received through Mr. Quaintance.)

BOOK NOTICE.

CATERPILLARS AND THEIR MOTHS.—By Ida Mitchell Eliot and Caroline Gray Soule : The Century Co., New York ; 302 pages 8vo., 80 plates. (Price, \$2.00 net).

This is a very interesting and satisfactory book, written in an entertaining manner and full of useful information for any one who is engaged in rearing moths and studying their life-histories. The great value of the work consists in its evident originality ; the writers give us their own experiences and record their failures as well as successes. The first portion of the volume describes the simple apparatus employed in rearing caterpillars, how to take care of them, where to look for them, and tells as much as the ordinary collector requires to know about the eggs,

caterpillars, cocoons, pupæ, and finally the moths. The perusal of these chapters will greatly help any one trying to rear Lepidoptera and enable him to avoid many mistakes that he would otherwise be sure to make. A sufficient description is given of the external structure of these insects in their various stages to enable the reader to make intelligent records of his observations which will have some scientific value. A chapter is also devoted to the Parasites which so often disappoint one who has been patiently rearing a caterpillar and hoping to secure a perfect specimen of some rare moth. The following passage gives some admirable advice: "The best part of any one's equipment is the power of observation—quick seeing, unflinching carefulness, exactness of noticing and stating, and the patience which works hard and well, can bear the failure of its best plans and experiments, and begin over again next season with as much zest as before. Faithfulness, accuracy and patience are absolutely necessary to satisfactory work of this kind."

The second and larger portion of the volume records the life-histories, more or less complete, of about fifty species of moths belonging to the Sphinges, Bombyces and Noctuids, and tells how they were reared and brought safely to the perfect state. These descriptions are remarkably good and, what is more, highly interesting, being written in simple language free from all technicalities that are not necessary for accurate statements. The illustrations are regarded by the publishers as a unique feature of the book. They are 80 in number, beautifully executed photogravures, many of them perfect representations of the insect, for instance the moth and caterpillar of *Sphinx Kalmia* (p. 136), but a large number, we are sorry to say, are most disappointing, the specimens photographed being badly set, often imperfect and in some cases almost unrecognizable. As examples we may mention the moths of *Amphion nesus*, *Ampelophaga myron*, and *Leucartia acraea*. The caterpillars are nearly always beautifully depicted, and it seems a great pity that perfect and properly-set specimens of the moths were not chosen for representation. These defects impair the beauty but do not affect the value of the book, which will be a source of pleasure and a storehouse of information to every nature-lover who takes an interest in watching and studying the actual living objects and is not content with mere dead and dried specimens.

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ERRATA.

- Page 86, line 10, for Arochnophila read Arachnophila.
 Page 220, line 27, for Jujurtha read Jujurtia.
 Page 227, line 10, for Elâmpenæ read Elampinæ.
 Page 268, line 23, for Ameriginæ read Amesiginæ.
 Page 271, line 2, for Dissemphalus read Dissomphalus.
 Page 272, line 7, for Epyrus read Epyris.
 Page 273, line 23, for Perisimus read Perisemus.

